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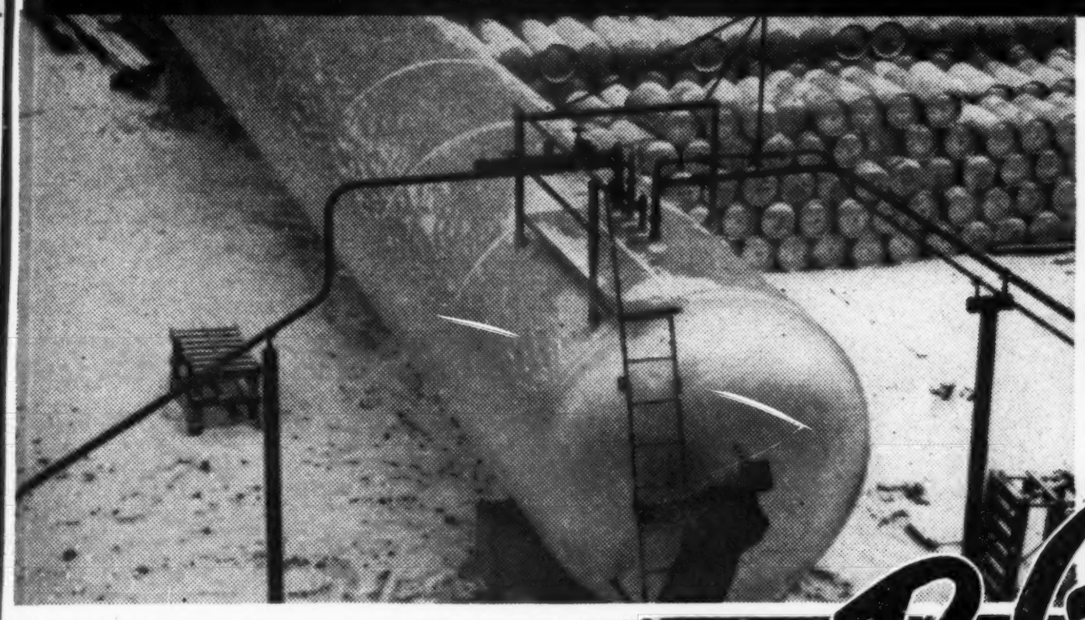

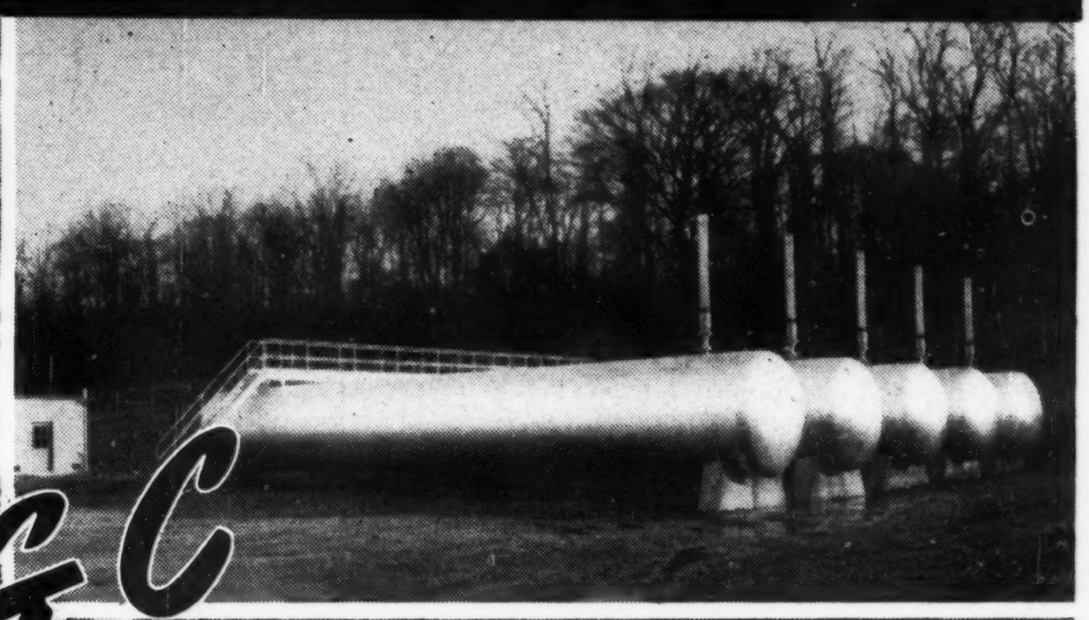

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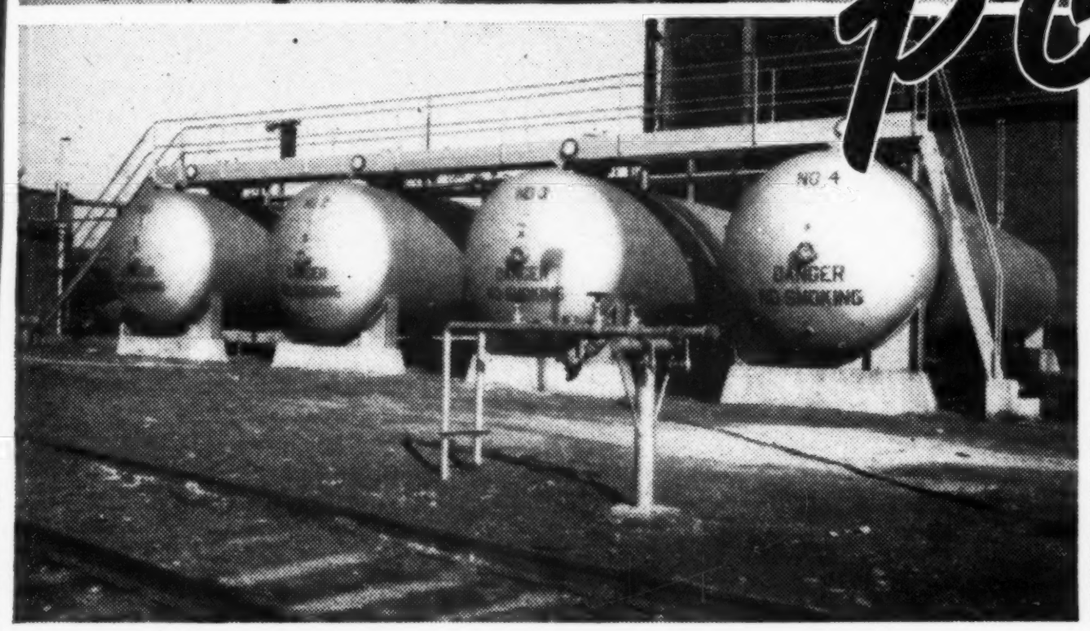

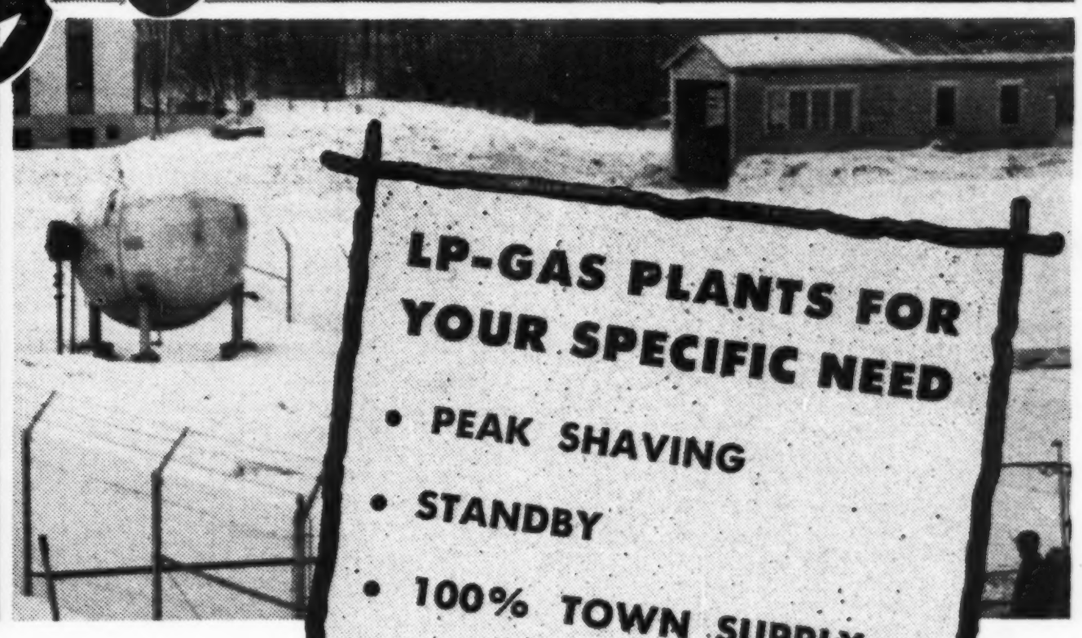

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GAS

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Highlights

WHO SAID "RECESSION"? Not the AGA, certainly. The committee on economics has taken another look at utility construction programs for 1948-1952 and revised its estimates upward to $3½ billion from the $3⅓ billion figure of last October. In 1948, $770 million was spent; in 1949, $943 million is being spent; in 1950-52 at least $1.8 billion will be spent, not including pipeline projects now planned but as yet unapproved. Compare this with $5.6 billion—total utility plant in 1947!

TEXAS EXPORT JUMPS. Large pipeline expansion is making itself felt in Texas. Last April, says the state railroad commission, pipelines took 30 billion cu ft more than a year ago, for a total of over 146 billion. This was 51.5% of total production of 285 billion; a year ago, the take was 44.5% of 261.5 billion. Of the remainder, cycling plants took 16%, carbon black plants took 10%.

TWO NATURAL GAS "FIRSTS." New York & Richmond Gas Co., Staten Island, and City Gas Co., Flemington, N. J., are the first gas companies to switch to natural in their respective areas. New York & Richmond, getting its gas from Texas Eastern's Big Inch, got the jump on neighboring boroughs, which will have to wait about a year and a half for gas from Transcontinental Gas Pipe Line Corp. City Gas, also tying in to the Big Inch, claimed to be first in all New Jersey.

MILESTONE RECORDED IN FEDERAL GASIFICATION JOB. James Boyd, Bureau of Mines director, revealed last month that a successful four-hour test run with all six burners operating had been made in June at the government's Louisiana, Mo., coal gasification unit. Feeding the gasifier with 2300 lb of coal per hour, 17,000 cu ft of oxygen, and 2000 lb of steam, it produced 70,000 scf of gas. Content was reported as 37% CO, 16% CO_2, 42% hydrogen, 4% nitrogen, 1% other. The gasifier, second of five, is part of the synthetic liquid fuels program.

ALBERTA ALL SET TO ISSUE EXPORT PERMITS. The proposed legislation reported in *GAS* last month is now on the books. The Alberta Petroleum and Natural Gas Conservation Board has been empowered through the bill to act upon applications. An allowable for gas and oil will likely be set up. When the planned lines to the U. S. Pacific Coast will be certificated is a subject of conjecture at present.

SOUTHERN UNION-TEXAS PUBLIC SERVICE MERGER OFFICIAL. The proposal for combining the Dallas and Austin companies reported last month (*GAS*, July, p. 110) became effective July 21. William Lawlor Jr., vice president of Texas Public Service, was named a vice president of Southern Union.

EL PASO NATURAL'S SAN JUAN LINE DOCKET STILL OPEN. Declaring that El Paso hasn't proved it has enough reserves to assure service through its proposed San Juan Basin to Topock (Ariz.) line for ultimate delivery to San Francisco, the FPC has refused certification but is holding the docket open for further evidence. (See "Pipeline News" in this issue.)

CHICAGO MAY GET ANOTHER PIPELINE. Peoples Natural has a third line for the city on the drawing boards. (See "Pipeline News" in this issue.)

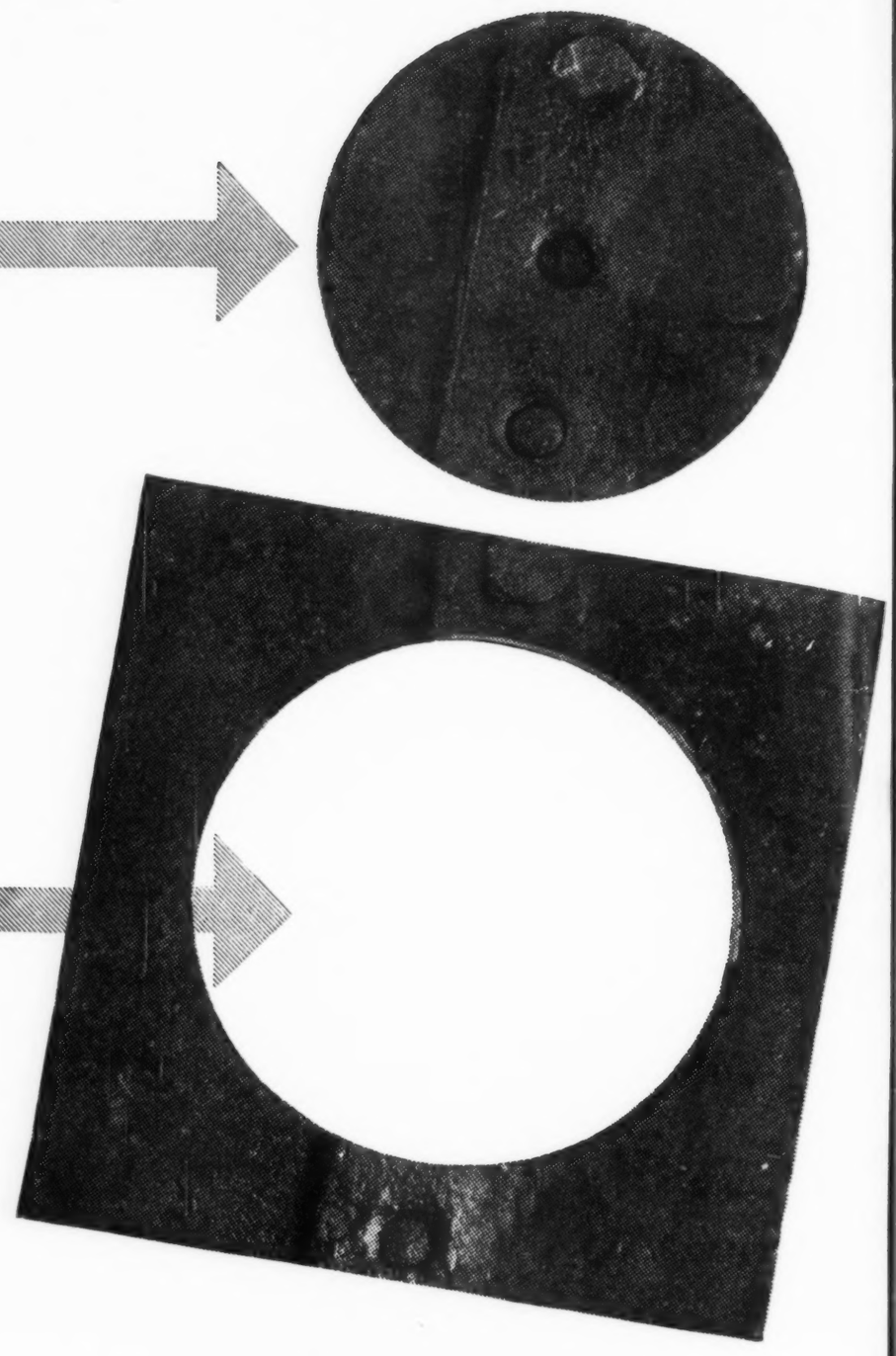
THE COSTLIEST PIPELINE OF THEM ALL IS HINTED. American Gas Transit Corp. Ltd., a Canadian company, is reportedly readying a plan to build a $300-million, 1300-mile 30-in. line from Southern Louisiana to an undisclosed point. (See "Pipeline News" in this issue.)

STANDARD CUBIC FOOT OF GAS ESTABLISHED IN TEXAS. A far-reaching bill became law in Texas with the passage of the Lane-Fly measure, defining a cubic foot as one measured at 14.65 psi at 60°F. As a result, many contracts will probably have to be rewritten, and gas prices in many other areas may eventually be affected.

FIRST GAS INVESTMENT TRUST SET UP. Initial distribution of shares of Gas Industries Inc., New York investment trust whose activities will be largely centered on gas industry financing, was made last month in a public offering of 440,000 shares. First offering was for Southern Union Gas Co. securities.

UTILITY WATER HEATER INSTALLATION DRAWS PLUMBERS' FIRE. The Gas Consumers and Independent Appliance Dealers of Metropolitan Washington last month petitioned the courts to prosecute Washington Gas Light Co. for alleged violation of District of Columbia law. The dealer group said the utility contracts to install water heaters, using employees who are not licensed plumbers and neglecting to have them licensed. Unfair trade practice and unjust competition were also charged. Washington Gas Light is still to be heard from in reply.

IT PAYS TO CUT THIS COUPON



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TANKS

THERMALLY THINKING

By EDWARD TITUS

remove senseless taxes

NOW IS THE TIME for telling the story of the unfairness and the damage to industry and employment and home building, of the excise taxes on ranges, water heaters and refrigerators.

Memo for immediate action:

If Congress is still in session when this reaches print—and if the issue of whether these excises are to be repealed is still in the balance—wire, or preferably telephone your Congressman, person-to-person, about it.

With a big push, and the facts presented forcefully to enough senators and representatives by influential constituents from back home, at this writing it appears just possible these taxes can be gotten rid of at this session. Otherwise the effort will go on, and the repeal question will come up sometime next year.

Just what are these taxes and how did they originate?

They are highly discriminatory 10% taxes on the manufacturer.

No one ever claimed that ranges, water heaters, commercial cooking equipment and refrigerators were luxuries. Certainly no more luxuries than a bathtub or lawn mower.

Then why were the taxes put on in the first place?

The answer is that in the period of frantic war preparation before Pearl Harbor it was desired to cut down on use of steel for consumer purposes, and on production of manufactured goods of any sort not directly connected with war.

So these taxes were put on, partly for revenue and partly in the hope of reducing or stifling production of these items.

It was hoped the taxes would provide added impetus for getting busy on items needed for the expected involvement of the United States in World War II.

Now the reason no longer exists. Instead of a need to persuade the public to buy fewer durable articles, the need is to stimulate such purchases, in order to keep industry rolling and get men who have been laid off back in their jobs.

At a July meeting in New York the gas appliance industry teamed up with other industries affected by excise taxes. It was calculated that elimination of all these excises, except for the traditional taxes on tobacco and alcohol and gasoline, would cost only $350 million a year in receipts, actually only a drop in the bucket with the present federal budget.

However—and here is the nub of the situation—it is reliably stated that this $350 million would be more than made up through the fact that stimulation of industry by repeal of the taxes would improve the government's financial position in the following ways:

1. *Increased returns from personal and corporate income taxes, resulting from the increase of business in industries now affected by the excise taxes.*
2. *Reduction in unemployment benefits.*

The present excise taxes are discriminatory against the gas industry because they affect certain household appliances while exempting others less essential. For instance, vacuum cleaners and washing machines are free of tax. The reasons which led Congress in 1943 to remove the tax on vacuum cleaners to avoid "a competitive disadvantage as compared to producers of other untaxed electric appliances" are equally valid to support a removal of the excise tax on stoves.

If full employment is to be achieved in this country, with a minimum draft on the federal treasury for publicly financed work projects ("busy work"), essential private industry must be given every opportunity to expand its markets. But a prolonged continuation of excise taxes will retard sales.

Another factor to be borne in mind is that right now is the time to fight for removal of these taxes. Don't let them become a confirmed habit of the government, like taxes on tobacco and alcohol (or the salt tax the Chinese have paid for a few thousand years!)

If the war was the excuse for them—the war was over four years ago.

tools of food production

NOW ON THE MATTER of commercial cooking appliances:

There is probably no industry today that has a comparable burden imposed on its necessary tools of production. It would be a parallel case to place an excise tax on woodworking machinery or shoe machinery.

The tax on commercial cooking and warming equipment operated by gas, electricity and oil, like the taxes on household ranges, is vicious partly because it is a hidden tax, and thus is easily forgotten. Probably few restaurant operators know of its existence, despite the fact that on a purchase of $70,000 worth of equipment the tax would cost them $7000 — a large slice out of the profits to be made from such equipment. It's doubtful, moreover, that more than one in 100 consumers knows about these taxes.

To show further the obvious discriminations of this tax in the commer-

cial field:

The Revenue Act of 1942 eliminated the excise tax on other commercial appliances such as beverage coolers, ice cream cabinets, water coolers, food and beverage display cases, food and beverage storage cabinets, ice-making machines and milk cooler cabinets. And although the tax is imposed on commercial cooking and warming equipment operated by gas, electricity or oil, it is not imposed on equipment otherwise operated, for instance, coal-burning ranges used in restaurants.

water heaters and refrigerators

ON WATER HEATERS:

Here again there is rank and obvious discrimination. The tax is on the manufacturer's sale price on gas, electric and oil water heaters only. There is no similar excise tax on coal-fired heaters or furnace coils. The line is narrowly and arbitrarily drawn. There is discrimination among various types of heavy household appliances and between various types of water heaters.

A large market for water heaters exists in large-scale housing project construction. On these projects contractors compute their material and labor costs, and then add a percentage markup to cover indirect cost and profit. This means a pyramiding of the 10% excise tax. Its elimination would thus save the home owner more than just 10% of the water heater cost. And the end of this tax would be a step in the right direction toward reduction in cost of housing and revival of the collapsed building boom.

Hot water is a necessity, with 150 household uses, and there is no more reason for an excise tax on hot water heaters than on the production machinery of any other necessity.

And refrigerators:

What reason is there for the government to penalize food preservation with a discriminatory tax, and meanwhile spend millions every year from tax receipts to subsidize food production?

how the fight lines up

UNTIL THIS SUMMER the fight against excise taxes has not been as effective as it might have been because different industries affected have failed to unite. The effect on Congressmen has therefore been infinitesimal. Most senators and representatives probably have had no idea that household necessities like ranges, water heaters and refrigerators were taxed at all—not to mention the highly discriminatory rate of 10%.

Due to the fact that these taxes affecting the gas industry were passed as a production-restricting measure, separately from the strictly wartime luxury taxes, there was even danger that some of the actual luxury taxes would be repealed or reduced while the necessity taxes affecting the gas industry would be forgotten and left as they are.

The leaders of the gas appliance industry have now seen fit to work with those seeking repeal or reduction of other taxes in the luxury class.

The reasoning now is that even if a fur coat or an airplane trip to Europe is not a necessity, it's time to encourage this kind of luxury expenditure. Now is the time to persuade the public to buy luxuries, large or small. And economists agree that excise taxes are a decided deterrent to business.

More than 50 representatives of about 22 associations attended the New York meeting. Tax-plagued groups invited included air transport, jewelry, railroads, furs, movies, chain stores, music, photography, shoes, electricity, highway users, druggists, and toilet goods, and last but not least, gas appliances.

The industry is ably represented in this matter by the Gas Appliance Manufacturers Assn. This association has engaged a representative to handle the problem in Washington, in a completely frank and straightforward manner, in accordance with the laws laid down by Congress. The fight will be waged on its merits.

It is believed that if the groups affected will stick together and if legislation can be gotten out of committees and onto the floor of both houses of Congress, the vote will be for ending wartime excise taxes. Possibly by the time this reaches print, this will have happened. But probably not. Yet there may still be time for a real push to get rid of the taxes this session.

The likelihood, however, is that the question will go over till next year. Those concerned should prepare to fight it through to a finish then.

P.S. To repeat, phone or wire your Congressman, if the excise tax issue is still undecided and Congress is still in session.

sound PR practice

WELL WORTHY OF STUDY from a public relations point of view are the methods used by Consolidated Edison Co. of New York in its recently inaugurated tours of Hunts Point plant.

Open house programs are one of the nine points in community relations recommended by the American Iron and Steel Institute. As reported in *GAS* of September 1948, the institute suggests companies open their front door and invite people to look around. It is part of making the consumer better acquainted with industry, and part also of the day-by-day battle to preserve the American way of life against threatened encroachment by various isms.

Consolidated Edison has scheduled its tours for the general public Monday through Friday, except holidays. The plant can make 144 MMcf in a 24-hour day and is among the world's largest.

The tour takes about an hour, begins at an air conditioned reception room which has posters, photo murals, exhibits and samples of by-products of gas manufacturing. Visitors see the dock and coal-unloading equipment, facilities for processing and preparing coke, producer and oven gas plants, gas cooling towers, and by-product installations. They visit the recently enlarged water gas plant for a dramatic close-up of gas manufacturing.

As a souvenir each visitor receives a brochure with a map and photographs telling what he has just seen.

This is a tour which should appeal not only to residents, but also to visitors to New York. The company doubtless has informed tourist information centers about it.

It looks like a good pitch for ConEd and the industry.

addendum

AND THAT'S NOT ALL. Public relations-conscious ConEd has also come forth with an industrial-relations gimmick that's a prize-winner. It's a report, covering much the same ground as a modern stockholders report, of operations in 1948—only this one was distributed to its 30,000 employees. However, its slant and content is different from that of a stockholder statement: its appeal is more popular without its committing the bad error of "talking down" to its people; it stresses the teamwork which brought the company through a trying year, weather-load-wise and expense-wise; it explains why rate revisions had to be sought and why expenses mounted; it tells what expansion of company production facilities will mean in the future; foremost, it points out how "extras" totaling $11.28 per week per employee boosted his real wage.

It should induce employees to "tell their friends."

It's worthy of emulation.

TECHNICAL TRENDS

by Guy Corfield

Jump Spark Holiday Detectors

A "HOLIDAY" is a term used by pipeline operators to signify a void, break, bare spot, very thin spot, pinhole, etc., in a pipeline protective coating. Two prime requisites of a coating are that it be electrically resistant and maintain that property by resisting penetration of moisture. Its dielectric strength is therefore a measure of its effectiveness and continuity, and can be conveniently tested by application of a high voltage electrical potential across it, meanwhile observing the electrical leakage through it by sparking and other evidence.

In practice, one side of the high tension electric circuit is connected to the pipe, and the other side to an electrode that can be moved across the surface of the coating. Wherever sparking occurs a holiday is indicated and its location can be marked for subsequent repair. This procedure has developed from a rather crude, uncertain and doubtfully effective operation to a scientifically sound technique that is now quite generally used as an effective inspection procedure often incorporated in contract specifications. It is becoming more and more evident that a pipe coating that is inherently moisture-resistant and physically strong, and has passed the jump spark test (prior to careful backfilling in the ditch) to expose holidays that may not be visible with even the most careful visual inspection, can be expected to provide a long period of protection to the buried structure.

Some operators have been reluctant to accept the jump spark test, asserting that the high voltage, a thousandfold greater than encountered in service, will actually puncture and damage a coating that would otherwise be acceptable. Others feel that it will not disclose all holidays under all conditions and therefore is of questionable usefulness and possibly an unnecessary and uneconomic operating expense. A technical evaluation of the technical and electrical factors shows these two opinions to be unfounded if reasonable understanding and precautions are employed. Tests on a number of representative asphalt and coal tar base enamel coatings, and plastic type coatings, show that the voltage, either alternating or direct, required to puncture is of the order of 400 or more volts per mil of thickness. This would be equivalent to 25,000 volts for 1/16-in. thickness, 50,000 volts for ⅛-in. thickness, and 100,000 volts for ¼-in. thickness. Similarly, the voltage required to jump dry air gaps is of the order of magnitude of one-tenth the above or 2500 volts for 1/16-in., 5000 volts for ⅛-in., and 10,000 volts for ¼-in.

It is therefore obvious that there is a liberal margin between the minimum voltage required for testing (which is that voltage which will jump an air gap of length equal to specified coating thickness) and the voltage that will puncture this same thickness of non-defective coating; or, stated more explicitly, a coating of specified thickness will not be punctured by a voltage high enough to jump the equivalent air gap unless the coating is one-tenth or less of the specified thickness. It follows that a jump spark detector can not be used as a thickness tester unless the voltage is raised to many times that necessary to detect holidays.

In actual practice, it is usually necessary to adjust the voltage somewhat above the minimum necessary to jump an air gap of length equal to the specified coating thickness. For one thing, the holiday may not be vertically through the coating, in which case the air gap is longer than the specified thickness. There are also voltage losses due to electrode-to-pipe capacity, and current leakage caused by damp atmosphere, moist wrappers, etc. On damp days this leakage may be so great that signal devices such as glow lamps will operate continuously, and there may be some surface spark noise, even though there are no holidays in the coating. A simple test whereby the operator may "pilot" himself at any time is to make a small holiday in the coating and see if the spark will jump normally and detectably. If it will not, testing should not be done until either the instrument is properly adjusted or repaired or the moisture condition is relieved. The usual types of wrapper in current use, even when dry, have practically no dielectric strength and will not interfere with testing.

In their initial form jump spark detectors were relatively crude devices consisting typically of dry cell batteries, Ford spark coils, and a "wire brush" as an electrode. They have now been developed into carefully and conveniently designed instruments, relatively light and portable, employing ingenious types of electrodes including coil springs which roll along the pipe covering the entire circumference with one pass. Output voltages are adjustable, both alternating and direct types being used. They may be equipped with neon lights, and bells or buzzers, to provide signals other than the actual noise and visibility of the spark between the electrode and the pipe. They can be procured on either a rental or purchase basis.

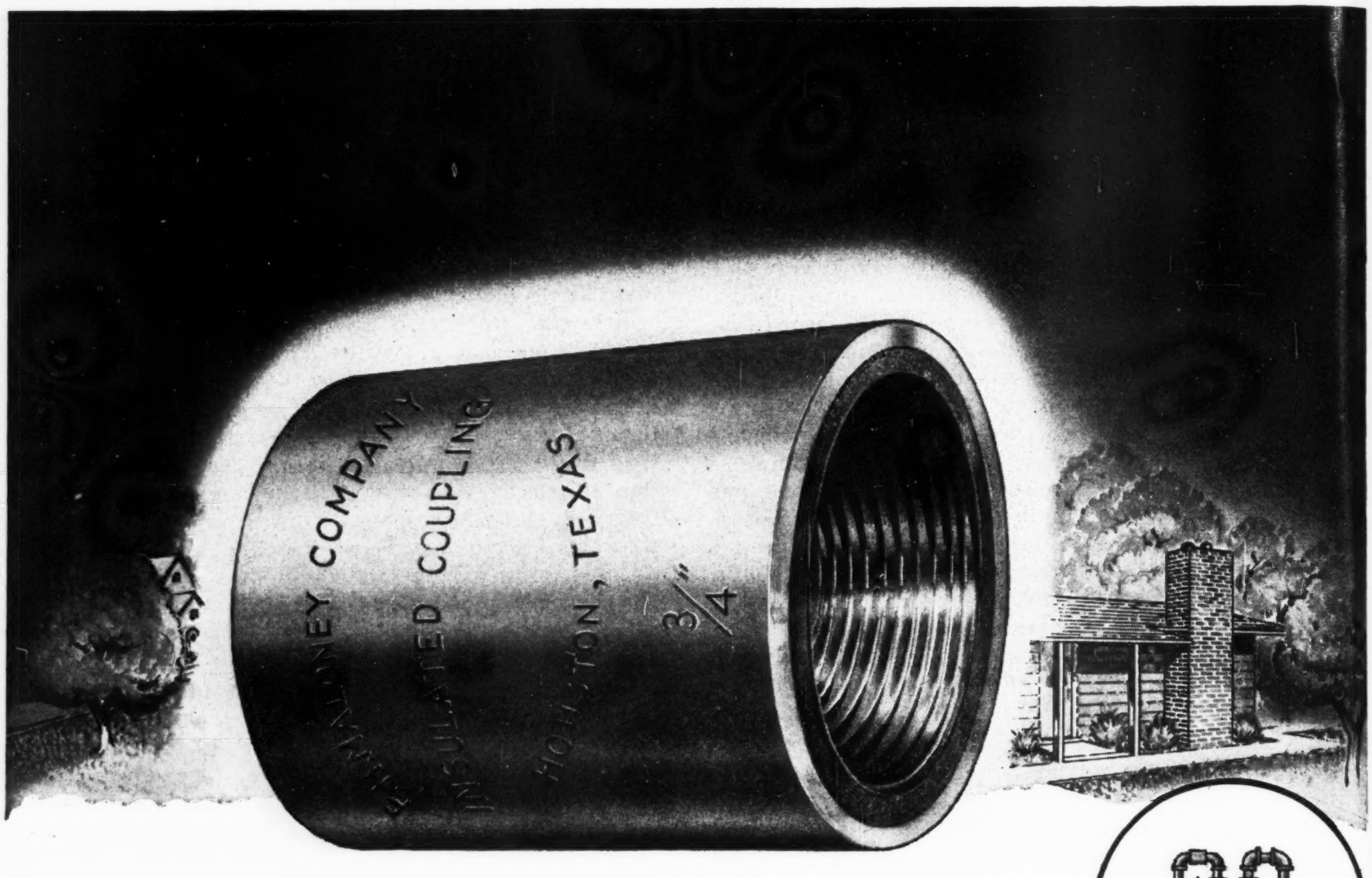
Synthetic Rubber Plants

"GOVERNMENT RUBBER is still gummed up," to quote from a recent item in *Chemical Engineering* which comments on the preliminary report on disposal submitted by the Office of Rubber Reserve.

Rubber Reserve recommends that the government sell its rubber plants at fair value prices based on cost of building comparable facilities, while the rubber industry recommends a maximum sale price not greater than 20-25% of what the government paid originally. The government wants 20% down and balance in 10 annual payments while the rubber companies expect 10% down.

All parties agree that Congress must set a level of "assured usage" of synthetic rubber to protect the plant operators against underselling by natural rubber; and even with this assistance, considerable apprehension is felt regarding the red tape that would probably be involved.

Meanwhile, the President is not required to submit recommendations to Congress before next January, and probably will not do so much before that date. Even after that, a lengthy study and discussion will probably ensue, and steps to actually sell the plants will most likely not be initiated until 1951.



3 3/8 Ounces

OF PREVENTION

Can safely be said to effect the pound of Corrosion Cure.

The installation of one of these Maloney armored couplings in the meter service line breaks the flow of electrical current, giving a positive, practical, and easy method of eliminating the corrosion caused by these currents.

The threaded inner core of linen base Westinghouse Micarta and outer sheath of cadmium plated seamless alloy steel tubing are "shrunk and locked" together to produce a rugged coupling that can take the punishment of a 14" pipe wrench and operate under a pressure of 500 P.S.I from —30° F to 350° F

The Maloney Company can provide you with Armored couplings in the following sizes: ½", ¾", 1", 1¼", 1½", and 2"; and reducers ¾" x ½", 1" x ¾", 1¼" x ¾", 1¼" x 1", 1½" x 1", 1½" x 1¼" or "tailor" them to your specification.

"Precision in rubber, metals and plastics"

F. H. MALONEY CO.

P. O. Box 1777 Houston, Texas

PROMOTIONAL NOTES AND NOTIONS

by Stanley Jenks

An Ultimatum

PRENTISS M. BROWN, chairman, Detroit Edison Co., at the stockholders' annual meeting in May, stated the company's main promotional effort this year would be on electric automatic water heaters, because they use off-peak power and use three times as much electric energy as an electric range. In this, he really echoes the promotional thought of the entire electric industry in the residential field. In fact, he put his finger on where our most intensive "Court of Flame" automatic gas water heater competition can be anticipated.

The water-heating load is valuable to the electric industry, and it has gone to great lengths rate-wise to get it. But we have three great advantages: (1) the higher electric initial installation cost, (2) a much quicker recovery rate and a consequent economy in storage capacity, and (3) generally lower operating costs when and where we have the cooking load.

But these basic favorable advantages are not going to stop the electric boys, who will be in there pitching. The only thing to stop them is a continuous, prolonged effort on our part along the lines detailed in the current "Court of Flame" national campaign. That is a "must."

Another thought is this: Any success accruing to the electric boys is primarily contingent on their having the electric cooking load ahead of their water heater. Otherwise, the latter cannot begin to justify itself economically if it has any on-peak usage at all.

Therefore, retention and development of the gas cooking load is vitally important. Fortunately, this basic fact is well recognized throughout the gas industry and the danger of neglecting gas range sales is very slight, although the major sales effort this year is being concentrated on automatic gas water heaters.

Historical

RECENTLY, WHILE IN LONDON on a business trip through western Europe, I had the pleasure of being presented, by the publisher, Clifford A. King, with a special souvenir book marking the Centenary of the British *Gas Journal.*

Incidentally, this book is exceedingly interesting historically and very well prepared. I feel at least one copy should be in the library of every American gas company.

Included is a page of satirical cartoons lampooning the efforts of Winsor, who, you remember, pioneered the manufacture and distribution of gas at the turn of the 19th century. The cartoonists—how like our today's crop—worked overtime for a laugh at the expense of poor, struggling Mr. Winsor. Their theme, as you can guess, was explosions, stinks, and discomforts, in their efforts to paint Winsor as "a mad alchemist, a motleyed jester . . . Bewigged gentlemen of the engravings mouthed imprecations and cried 'stinking smoake.'" The great novelist Sir Walter Scott was in the vanguard of the opposition, ridiculing the idea of "lighting London with smoke."

All this happened nearly 150 years ago. Since then, the gas industry, persevering through research, experimentation, and development, has evolved into a key pillar of our modern civilization, a boon that the public (genus americanus) needs and accepts gladly, because gas service is harnessed safely to its destiny.

Shuddery Shadows

SOMEONE, PROBABLY Shakespeare (I always give Bill the credit when I can't nail it down), wrote "coming events cast their shadows before them." Personally, I don't like shadows gathering in Washington as the government tries to grab more and more control of those prerogatives which must be ours if that statue in New York harbor is not to be painted red. Welfare State! It's the great modern delusion, a phoney philosophy, if you please, expounded by the most power-hungry, pompous politicos ever foisted upon a too-tolerant populace.

There was a time when the government trusted the people, and the people trusted the government. That was when America prospered and became great. Not so today, when it's plain as a pikestaff that the government, strong-armed into power by self-interested, well organized minorities, mob infatuation with highfaluting, impractical promises, and popular indifference, certainly does not trust the public. "Big Brother" in Washington knows best. Turn over everything to him, including your money, and he'll steer you through life—womb to tomb—without any worries. He'll take care of you when you'd rather go fishing. He'll send the doctor when you feel queezy. He'll run the utilities so that you'll be working for him rather than some greedy, grasping stockholder, who trusted you to manage his savings competently. In fact, why save? "Big Brother" will give you your spending money and in your old age provide you food and shelter in one of "Big Brother's" own institutions.

It is anything but a comforting prospect, but it is there nevertheless, unless we actively do something about it before it's too late. The shadows lengthen fast at twilight.

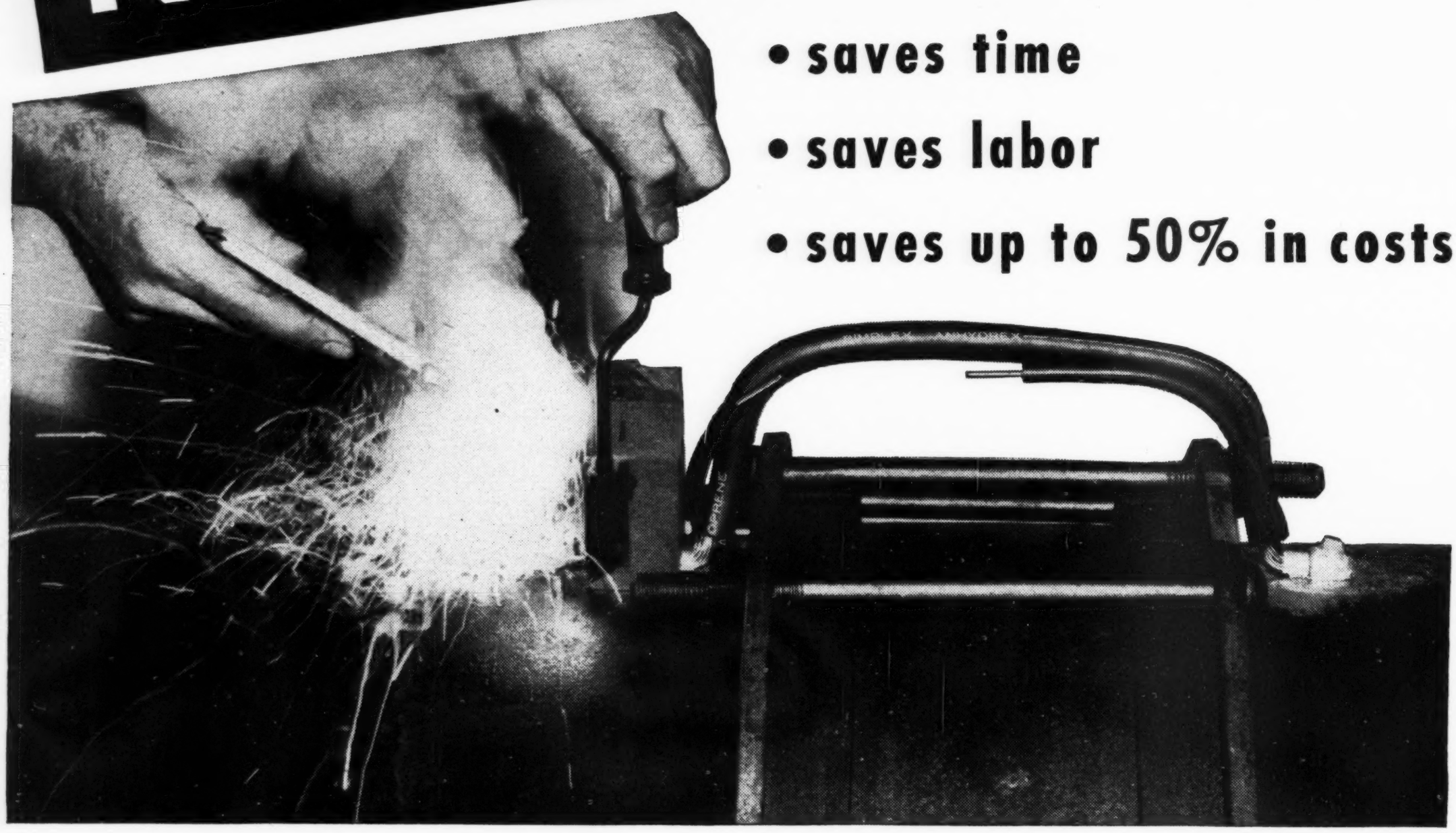
Have you read *Nineteen Eighty Four*, a futuristic novel by George Orwell? If not, do so and get a grim projected picture of the world of 1984 by a British socialist, who has seen the inevitability of the present trend unless a drastic change comes about very soon.

Statism stagnates all it controls. Utilities head the list.

Unrestricted Heating Load

IT IS VERY PLEASING, in this corner, to note that another of our big manufactured gas companies, Boston Consolidated Gas Co., has found it possible to remove the temporary restrictions on the further installation of gas heating equipment in homes and business premises. The additional capacity to handle peak loads when those icy winds blow across Boston Common is now available, and the gasification of Boston can again proceed, unhampered by the scarcities that made manufactured gas production and distribution so provokingly exasperating. Joe Quinn has every reason to know exactly what I mean.

NEW bonding process



- **saves time**
- **saves labor**
- **saves up to 50% in costs**

Corrosion protection is now greatly simplified by new *preformed* Dresser-Bonds and a 5-second chemical welding method that enable any workman to bond mechanical couplings on steel pipelines . . . quickly, easily and at a saving of as much as 50% over previously used bonding methods.

The resistance of the Dresser-Bond is as low as, or lower than, a bond made by any other method. It retains its superior bonding properties permanently because (1) a homogeneous weld area is attained and (2) all surface contact variables are eliminated.

There is no danger of burning the copper wire, pipe or inside pipe coating. No dangerous fumes. No heavy equipment. No training or special skill required. Everything you need for 50 complete bonds is contained in a compact kit which includes *preformed* bonds, chemicals, flint gun and welders.

The neoprene coated 1/0 cable of which Dresser-Bonds are made has been proved for years in underground service.

See the Dresser-Bond installed. Ask your Dresser Sales Engineer to demonstrate it or mail the coupon below for a low-cost trial kit.

DRESSER

MANUFACTURING DIVISION

(One of the Dresser Industries)

Headquarters: Bradford, Pa. Sales Offices: New York, Chicago, Houston, San Francisco. In Canada: Dresser Mfg. Co., Ltd., 629 Adelaide St., W., Toronto, Ontario.

Dresser Manufacturing Division , 59 Fisher Ave.
Bradford, Pa.

Gentlemen:

- ☐ Send me a complete trial kit of 12 bonds at $32.50.
- ☐ Have Dresser Sales Engineer call and demonstrate the Dresser-Bond.

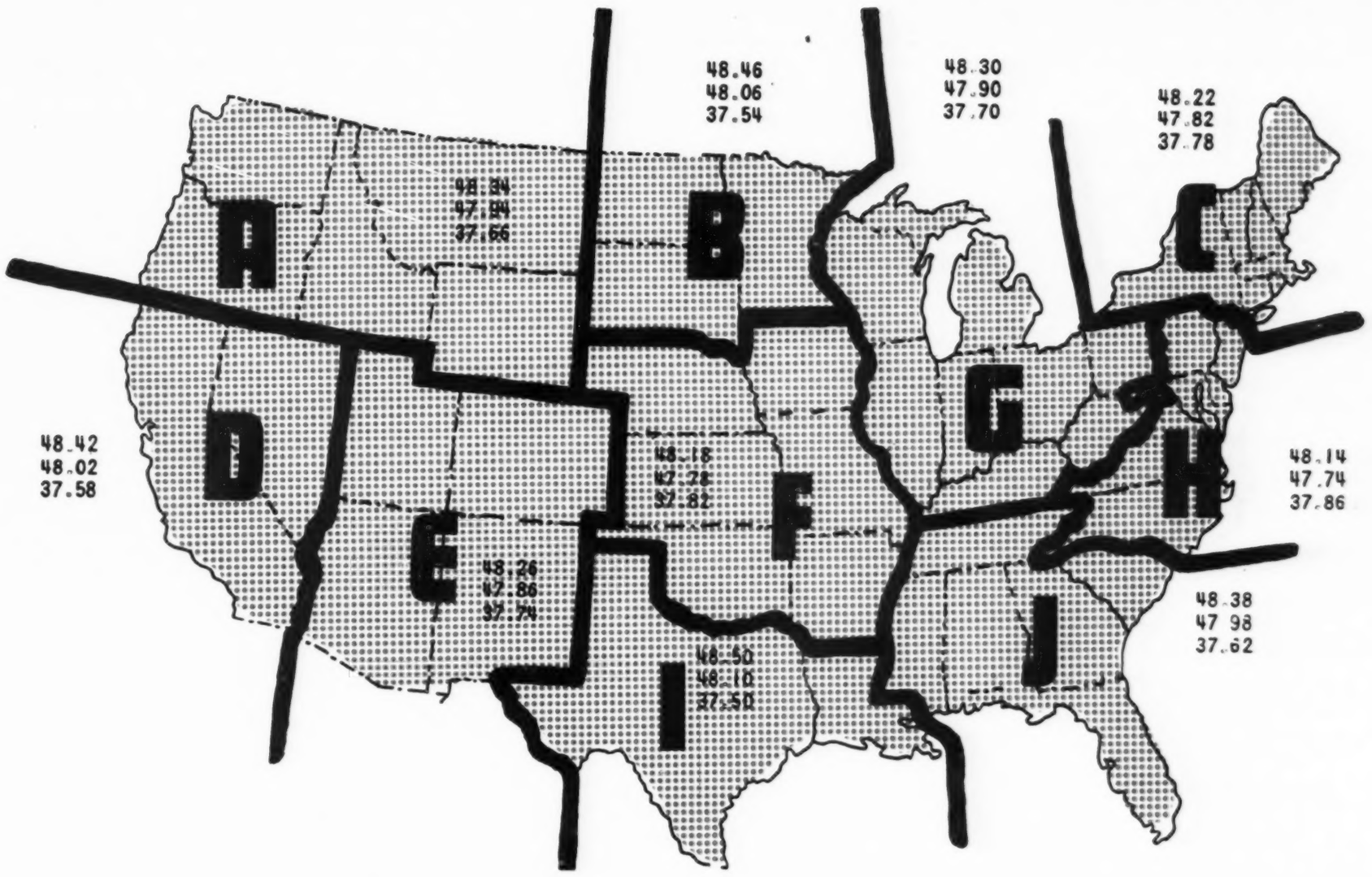
Name _____

Position _____

Company _____

Address _____

City _____ State _____



MASTER RADIO PLAN: a nationwide frequency schedule to assure uninterrupted service

A comprehensive nationwide plan for coordination of frequency assignments to utilities using mobile radio has been drawn up by the National Committee for Utilities Radio, acting under an order of the Federal Communications Commission of May 3, 1949, which went into effect last month. Delineating further, by regions, the limitations upon the use of frequencies from 30 to 50 mc allocated for utility use, NCUR has evolved the plan which is summarized on this page and which is graphically portrayed on the map.

Companies affected by this plan include all distributing utilities—gas, electric, water, and steam. Pipeline companies fall into a separate category, being lumped with oil operations under "petroleum services." Progress on coordination of these services is explained in the Pipeline News section of this issue.

What the committee has acomplished can best be explained by reprinting the NCUR letter of June 29 sent to all sponsor organizations—the AGA, EEI, American Public Power Assn., Assn. of Edison Illuminating Companies, Independent Natural Gas Assn., National Rural Electric Cooperative Assn., Rural Electrification Administration, and 10 regional utility associations and committees. It follows:

"At the time of its formation, the National Committee for Utilities Radio was charged with the responsibility, first, of persuading the Federal Communications Commission to allocate additional frequencies and secondly, of developing plans for the coordination of frequency assignments to the end that all users might enjoy the most effective use of their radio facilities.

"NCUR presented convincing evidence to the FCC and obtained for the Power Radio Service additional frequencies which became available on July 1, 1949. On that date new rules and regulations governing all mobile-radio services went into effect. These reallocate the frequencies available to the respective services, and transfer to other services all of the utility frequencies which are most heavily occupied at present. As a result only a few utility systems can remain on their present frequency and most must move.

"The question of which frequency each system should move to is largely answered by a National Plan for Coordinating Utility Frequency Assignments which was unanimously adopted by NCUR at its annual meeting on June 7. This plan culminates four years of intensive work to develop a sound, technical basis for the elimination of the present haphazard crowding on certain frequencies and for the alleviation and

PLAN FOR ZONE COORDINATION

1. The country is divided into 10 geographical zones for primary frequency assignments within the power radio service.
2. Three frequencies are designated as primary frequencies or zone channels in each zone.
3. Primary frequencies for adjoining zones are so chosen as not to fall on adjacent channels of the radio spectrum.
4. Within boundaries of a geographical zone, primary frequencies (zone channels) may be recommended by regional committee without reference to adjoining zone for coordination.
5. Likewise, any frequency may be recommended without coordination if system is located more than 100 miles within any border of the home zone.
6. Coordination with an adjacent zone is required:
   A. If frequency to be recommended is the primary frequency of the adjacent zone and the system is located within 100 miles of the common boundary; however, a committee should not normally recommend said frequency to a member who will be located as close as 100 miles to the border of the zone from which frequency is "borrowed."
   B. If frequency to be recommended is other than the two primary frequencies of the home and adjacent zones, and the system is located within 50 miles of the common boundary, unless clearance has been given to the committee of the latter zone to use said frequency in a specific conflicting location which is less than 50 miles from the border.
7. All other recommendations not covered by 1 through 6 must be arrived at by consultation and agreement with the committee responsible for the affected adjoining zone.

control of interference between utility radio systems.

"The cornerstone of the plan is the controlled occupancy of every available frequency according to a specific geographic pattern which covers the entire U.S.A. This fundamental principle has been recognized by the FCC, recommended by it to all other mobile services, and adopted by several.

"Within the Power Radio Service, ten Regional Frequency Coordinating Committees have the responsibility of recommending to all users the most suitable new frequency for their individual systems.

"These committees are now ready to explain the details of the national plan to all users, and to consider the economic and operating factors in individual cases before making recommendations. Their final recommendations, however, will be dictated largely by the complex, technical factors incorporated in the national plan. For some systems the recommended frequency will be within the range of adjustment of present equipment, and the change can be completed at a very nominal cost. For others, slight modifications of the equipment will be necessary, and the cost will be greater, although still nominal (normally between 10 and 15% of the total radio system investment).

"If the objectives of the industry are to be realized and the efforts of the national committee are to bear fruit, it is essential that each licensee waive his personal preference, accept whatever cost differential may be involved, and conform to the final recommendation of the Regional Frequency Coordination Committee. In no other phase of utility activity is there so vital a need for complete and nation-wide coordination.

"Yours very truly,
"NATIONAL COMMITTEE
FOR UTILITIES RADIO
"R. V. Dondanville, chairman"

NATIONAL COMMITTEE FOR UTILITIES RADIO

The Secretary
Federal Communications Commission
Washington, D.C.

Dear Sir:

In May 1947, representatives of the power utilities discussed with members of the commission's staff a generalized proposal which they had developed for the alleviation of "skip interference." The basic plan requires the coordinated assignment of all the frequencies available to a mobile service, according to a specific national geographic pattern. This proposal, which was conceived by Mr. G. H. Underhill, was favorably received by the staff and was commended to the consideration of other mobile services. It was formally submitted to the commission on Oct. 11, 1948, in connection with the testimony of Mr. Underhill in Docket No. 9018.

Two years experience under the plan and further study of the basic proposal led to several improvements. Following the issuance of the commission's comprehensive order of May 3, 1949, the improved version was applied to those 30 to 50 mc. frequencies which became available to the Power Radio Service on July 1, 1949.

The National Committee for Utilities Radio herewith submits for commission consideration a specific plan which has been developed for the guidance of the ten regional coordinating committees in making individual frequency recommendations to potential licensees. This activity is believed consistent with the requirements of Paragraph 11.57 (a) — "All applicants for, and licensees of, stations in these services shall cooperate in the selection and use of the frequencies assigned in order to minimize interference and thereby obtain the most effective use of the authorized facilities."

Collateral to the plan, the NCUR requests that the commission designate the frequencies 35.06, 35.10, 35.14 and 35.18 mc. as available for assignment to mobile stations only in the Power Radio Service. These frequencies are shared with Maritime Mobile.

Comments concerning the plan or the activities of NCUR in its endeavor to coordinate the use of Power Radio Service frequencies will be appreciated.

Very truly yours,

(Signed) R. V. DONDANVILLE, chairman

This letter of transmittal accompanied a copy of the plan sent to FCC.

REGIONAL FREQUENCY COORDINATING COMMITTEES

Utility Radio Association of New England
R. W. Lewis (chairman)
Boston (Mass.) Edison Co.
F. A. Hubbard (vice chairman)
New Bedford (Mass.) Gas and Edison Light Co.
J. H. Hanly (secretary)
Blackstone Valley Gas & Electric Co., Pawtucket, R. I.
Individual to Contact on Frequency Assignment Matters:
W. C. Phillips
New England Power Service Co., Boston

Middle Atlantic Utility Radio Association
J. M. Comly (chairman)
Consolidated Edison Co., New York
G. E. Dana (vice chairman)
New York State Electric & Gas Corp.
Binghamton, N.Y.
H. N. Ekdall (secretary)
Philadelphia (Pa.) Electric Co.
Individual to Contact on Frequency Assignment Matters:
C. S. Young
Pennsylvania Power & Light Co., Allentown

Great Lakes Radio Committee
H. J. Smith (chairman)
Equitable Gas Co. Pittsburgh
H. E. Antle (vice chairman)
Boone County REMC, Lebanon, Ind.
H. D. Ashlock (secretary)
Public Service Co. of Indiana, Inc., Indianapolis
Individual to Contact on Frequency Assignment Matters:
J. G. McKinley
West Penn Power Co., Pittsburgh

Mid-Central Utilities Radio Committee
C. H. Sutter (chairman)
Kansas Gas & Electric Co., Wichita
G. R. Sutton (vice chairman)
Iowa Power & Light Co., Red Oak
Lee O'Dell (secretary)
Kansas City (Mo.) Power & Light Co.
Individual to Contact on Frequency Assignment Matters:
Harold Hartman
Oklahoma Gas & Electric Co., Oklahoma City

Southeast Utility Radio Group
Joel Daniel (chairman)
Georgia Power Co., Atlanta
Blair Jenkins, Jr. (vice chairman)
Carolina Power & Light Co., Raleigh, N.C.
V. R. Parrack (secretary)
Florida Power Corp., St. Petersburg
Individual to Contact on Frequency Assignment Matters:
Blair Jenkins, Jr.
Carolina Power & Light Co., Raleigh, N.C.

Utilities Radio Coordinating Association of Texas and Louisiana
Paul Taylor (chairman)
Central Power & Light Co.
Corpus Christi, Texas
O. C. Roddie (vice chairman)
Interstate Natural Gas Co., Monroe, La.
M. W. McRaven (secretary)
Houston (Texas) Lighting & Power Co.
Individual to Contact on Frequency Assignment Matters:
W. W. Eckles
Gulf States Utilities Co., Beaumont, Texas

Southwest Committee for Utilities Radio
C. T. Malloy (chairman)
Southern California Edison Co., Los Angeles
R. H. Miller (vice chairman)
Pacific Gas & Electric Co., San Francisco
G. E. Bishop (secretary)
Coast Counties Gas & Electric Co.
Santa Cruz, Calif.
Individual to Contact on Frequency Assignment Matters:
B. A. Currie
Department of Water & Power, City of Los Angeles

Northwest Utility Radio Association
W. A. Leidigh, Jr. (chairman)
Portland (Ore.) General Electric Co.
R. A. Benson (vice chairman)
City of Seattle (Wash.), Department of Lighting
L. G. Walker (secretary)
Idaho Power Co., Boise
Individual to Contact on Frequency Assignment Matters:
A. A. Noon
Puget Sound Power & Light Co.
Seattle 11, Wash.

Minnesota-Dakotas Utilities Radio Committee
R. A. Fischer (chairman)
McLeod Cooperative Power Assn., Glencoe, Minn.
Lewis Brown (vice chairman)
Freeborn-Mower Cooperative Light & Power Assn., Albert Lea, Minn.
Individual to Contact on Frequency Assignment Matters:
L. E. Moline
Northern States Power Co., Minneapolis, Minn.

Rocky Mountain Utility Radio Association
J. M. Wissenbach (chairman)
Public Service Co. of Colorado, Denver
J. C. Livesay (vice chairman)
Colorado Central Power Co., Englewood
L. F. Hayworth (secretary)
Southern Colorado Power Co., Pueblo
Individual to Contact on Frequency Assignment Matters:
J. C. Livesay
Colorado Central Power Co.
Englewood, Colo.

COMPASS Tests Pipe Insulators for Electrical Leakage

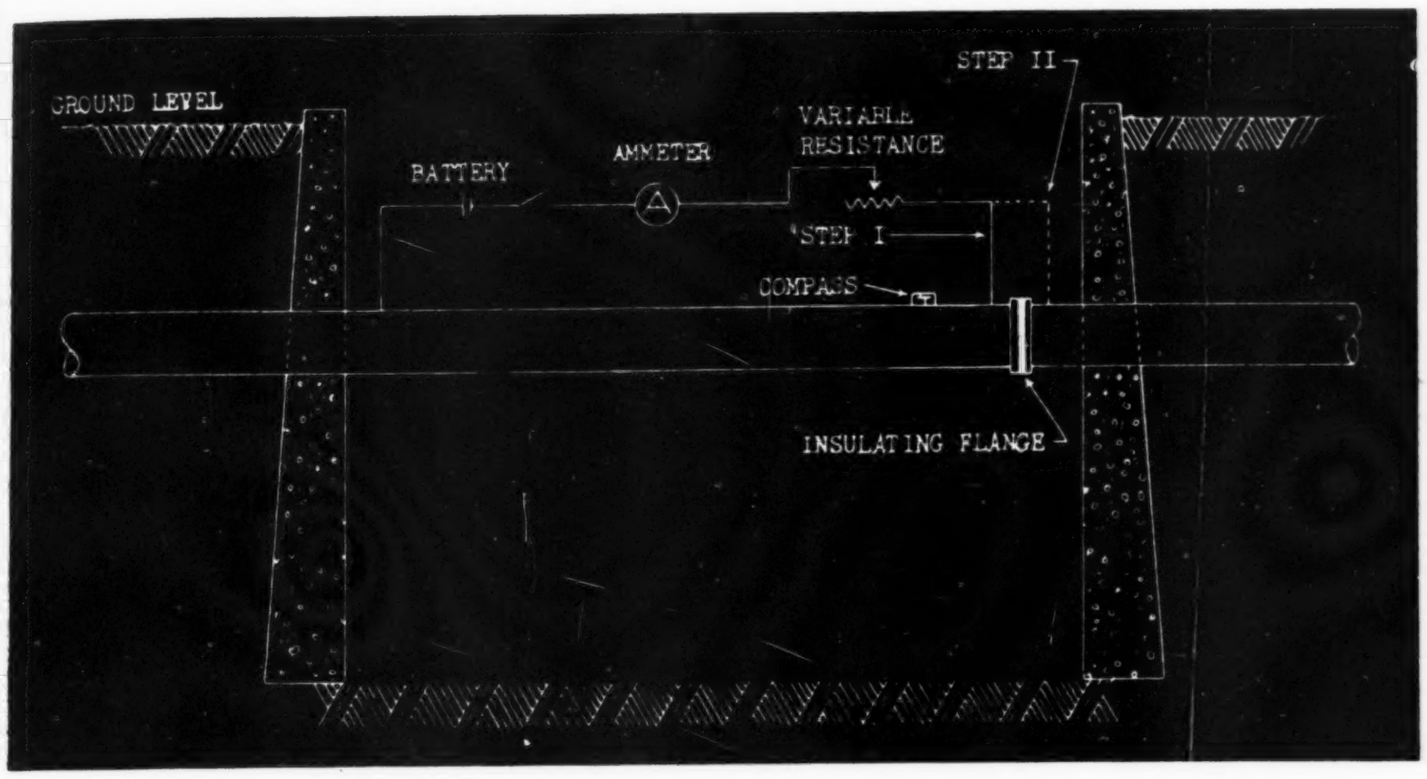


Fig. 1. Sketch shows method of testing insulating flange with magnetic compass.

By J. S. DORSEY

PIPELINE insulators are often installed in gas pipes to interrupt the flow of electric currents, and therefore, besides being gas tight, the insulators must have good dielectric qualities. Since it is certainly not feasible to cut the line and interrupt the service to test the electrical effectiveness of the insulator, it is necessary to use some other method.

If the pipe were suspended in the air, as an electric wire is, and there were only one path for the current to follow, it would be very simple to test the insulator. It would be necessary only to connect a battery across the insulator and to measure the resultant current flow, if any. However, a pipeline in the ground offers a different problem in that there is always a parallel path around the insulator through the ground so that there will be some current flowing through the soil if a voltage is applied across the insulator.

Need for a Test

Thus, it is impossible to determine from the amount of current flow alone whether the insulator is good or not. In order to do this, it is necessary to determine whether any of the current flows through the insulator itself. This has been rather difficult to do with the methods that have been used in the past, particularly when the insulator is in a large diameter pipe and there is only a short length of pipe adjacent to the insulator which is exposed and available for test purposes.

For these reasons, the method of testing insulators with a magnetic compass was developed, since with this method it is unnecessary to have more than a few feet of pipe exposed and it is possible to detect a fairly small current flow through the insulator even with large diameter pipe.

The test setup is shown in *Fig. 1*. It is a well known electrical phenomenon that if a magnetic compass is placed near a wire and a current is caused to flow through the wire, the compass needle will move to align itself so that it is tangent to the lines of magnetic induction. The same result occurs when current is caused to flow in a steel gas pipe. It should be noted that this deflection of the compass needle is caused by a build-up or collapse of the magnetic field, and that once a steady state has been reached no further deflection will occur. Therefore, referring to *Fig. 1*, the deflection on the compass needle should be observed when the switch is opened or closed.

The connections are first made as shown in Step I of *Fig. 1*. The current is adjusted to the minimum value necessary to cause a noticeable deflection of the compass needle when the switch is opened or closed. For most pipes this will be in the neighborhood of 0.3 to 0.5 ampere. The connections are then changed as shown in Step II. This time the current is adjusted to a value 10 to 20 times that used in Step I, but which should not be much more than 10 amperes.

The reason for limiting the current to not more than 10 amperes is that there is a magnetic field set up not only around the steel pipe but also around the current-carrying wire. This extraneous magnetic field may cause a deflection in the compass needle and thus cause the results of the test to be erroneous. Therefore, it is recommended that the maximum current be approximately 10 amperes, and even with this current care should be taken that the compass is kept a good distance from the current-carrying wire.

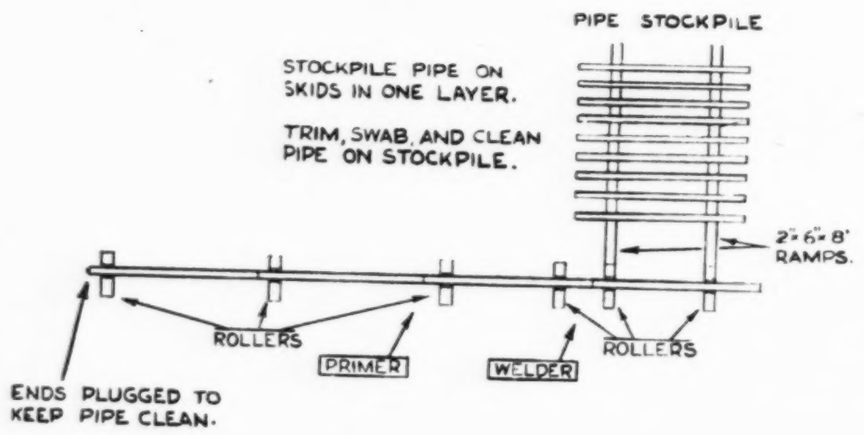
With the connections made as in Step II, it can be seen that if the insulator is defective so that a current flows through it equal to or greater than the value determined in Step I, then a deflection of the compass needle will be noticed when the switch is opened or closed. Conversely, if there is no deflection of the needle, any current flow through the insulator must range in value from zero to the minimum determined in Step I, and for all practical purposes the insulator may be considered satisfactory.

Example

For instance, suppose that in a particular case the minimum current necessary to cause a deflection of the needle is determined in Step I to be 0.5 ampere, and in Step II with 10 amperes total current flow there is no deflection of the compass needle, then it is obvious that in Step II less than 5% of the total current passes through the insulator. Therefore, the insulator is determined to be at least 95% effective, and probably it is 100% effective.

This test is very easy to make, and it is possible to test most pipeline insulators with much more accuracy than had previously been possible. As explained above, caution must be exercised that the compass is not located near enough to the current-carrying wires to be affected by their magnetic field, and of course the compass needle must not bind nor be stuck in one position. These are the only two factors which have caused any trouble in the use of this test, and with reasonable care any difficulty in this respect can be eliminated.

Mr. Dorsey, of Southern California Gas Co., presented this paper at the PCGA Technical Section's technical service group conference in Los Angeles, April 28-29.



Here's the heart of the method, the progressive welding layout. All operations—welding, testing, swabbing—on 500 ft of pipe can be performed at this single, central location, saving time and money.

PROGRESSIVE

THE progressive welding method, which requires use of ball-bearing roller skids, increases efficiency and contributes to the safety of crews while they are laying gas mains. This method of installing pipe is based on the idea that work which can be performed with maximum efficiency and ease results in the best work and the greatest economy. The principles applied to fulfill this idea are concentration of work within a more limited area and maximum utilization of mechanical equipment.

The ball rollers consist of a skid, 2 in. x 6 in. x 3 ft long, with two Type #501 Mathews ball transfers mounted in the center. These ball transfers, attached to 2 in. nipples and bolted to the skid, are placed in center of the skid facing each other and at a 45° angle. Pipe rolling on the ball transfers is approximately 4 in. above the 2-in. x 6-in. skid. The ball-bearing rollers in use at present have only two ball transfers on each skid. However, we have been experimenting with two skids with four smaller ball transfers on each skid in order to ascertain if there is any advantage in using this type. We have found some advantages but as yet do not have enough information to make a complete report.

This equipment is still in an experimental stage and can be improved considerably. There has been some thought of obtaining a light metal skid of either aluminum or magnesium to take the place the of 2-in. x 6-in. wood skid now being used. A skid of light metal would be more desirable because it would weigh less, be more durable, and not have the hazard of splinters.

The Mathews ball transfers cost $2.90 each, making the total cost of the skid a little more than $8.

Stockpiling

The pipe is unloaded in stockpiles at intervals considered most efficient for the particular job site. The pipe is welded at the stockpile and rolled away as each joint is added. Welding, testing, trimming, swabbing, and preparing ends of pipe if arc welding are done in a concentrated area. This method results in the least time lost because of moving, greatest welding ease and comfort, and most concentrated supervision.

Pipe is stockpiled on skids at approximately 500-ft intervals. Unloading is done from truck or trailer by use of 3-in. x 8-in. wooden ramps on which pipe is rolled to 2-in. x 6-in. skids on ground, in single layer. This eliminates the hazard of back strain from lifting pipe and also saves time because the unloading is done in quantities at one location.

The progressive welding method is much faster than the standard method of moving from one joint to another because 500 ft of pipe can be swabbed, trimmed, blown out and ends prepared for arc welding at one location.

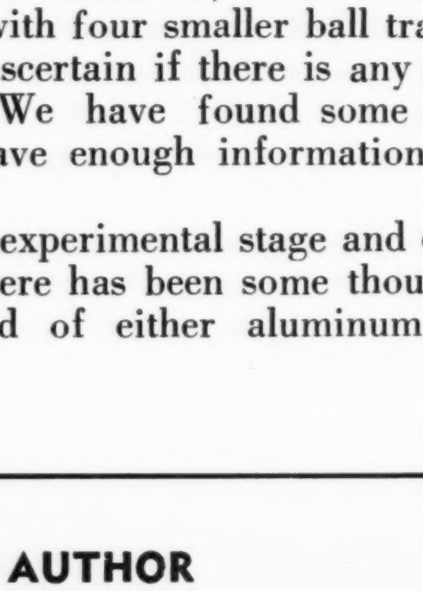
Where this much pipe is concentrated in one area, the compressor can be utilized to operate an air driven buffer for preparing the ends of pipe for arc welding with considerable saving over filing ends.

Rolling

After the above operations have been completed, pipe is then ready to roll from pile to ball-bearing skids and welded. It is important that the first four skids are aligned for height so that pipe can be rolled from stockpile onto rollers and the ends positioned for welding. This eliminates the aligning of each joint where contour of ground is irregular. After the welding operation is started, the welder sits on a stool and the pipe is turned on the roller by the helper.

As each weld is completed, pipe is rolled forward and helper cleans and primes weld while welder rolls another joint into position and starts next weld. By welding in this method, all necessary material and tools are concentrated in one location. This eliminates the constant mov-

ABOUT THE AUTHOR



Mr. Anderson, who is division gas foreman at Watsonville, Calif., for Coast Counties Gas & Electric Co., is rounding out 30 years in the gas and oil business. Following war service, he joined Southern Counties in 1919, working in the construction department at Pomona, Calif. From 1923-1925 he worked in the oil fields, returning to the utility business via Los Angeles Gas & Electric Co.'s distribution department. Loaned to Coast Counties to take charge of changeovers, he joined the company permanently in 1932 in his present job. He presented this paper at the PCGA Distribution Conference held April 7-8 in Los Angeles.

A method which concentrates work within a small area and utilizes mechanical equipment to its maximum saves time and money in laying gas mains

ELDING

By O. F. ANDERSON

ing from one location to another of the equipment. The interior of pipe is kept clean because the first joint is plugged after the pipe leaves the stockpile in order to keep dirt from entering.

Savings

Savings from the progressive welding method based on labor and overhead were arrived at in the following manner for three specific jobs. Estimates were made based on installing pipe in the standard method. The jobs were then done using the roller system method. When actual costs were compiled, they were compared with the costs of similar jobs installed by the standard method and the following savings were shown:

1. On 8600 ft of 4-in. main and 1180 ft of 2-in. main in Hollister, it is estimated that the cost per foot to run by the standard method would have been 70 cents. By using the roller system, we installed the job for 34 cents per foot, a total saving of $2924.
2. On 2020 ft of 3-in. main in Santa Cruz, the saving was 25 cents a foot, or $505.
3. A 2-in. main extension of 676 ft in Santa Cruz showed a saving of 14 cents per foot or $94.64.

This roller system method of laying pipe removes a maximum of the hard physical labor, leaving the men relatively fresh and energetic for the jobs that require careful attention.

Here pipe is being tested preparatory to wrapping, one of the several operations that can be performed in the one location.

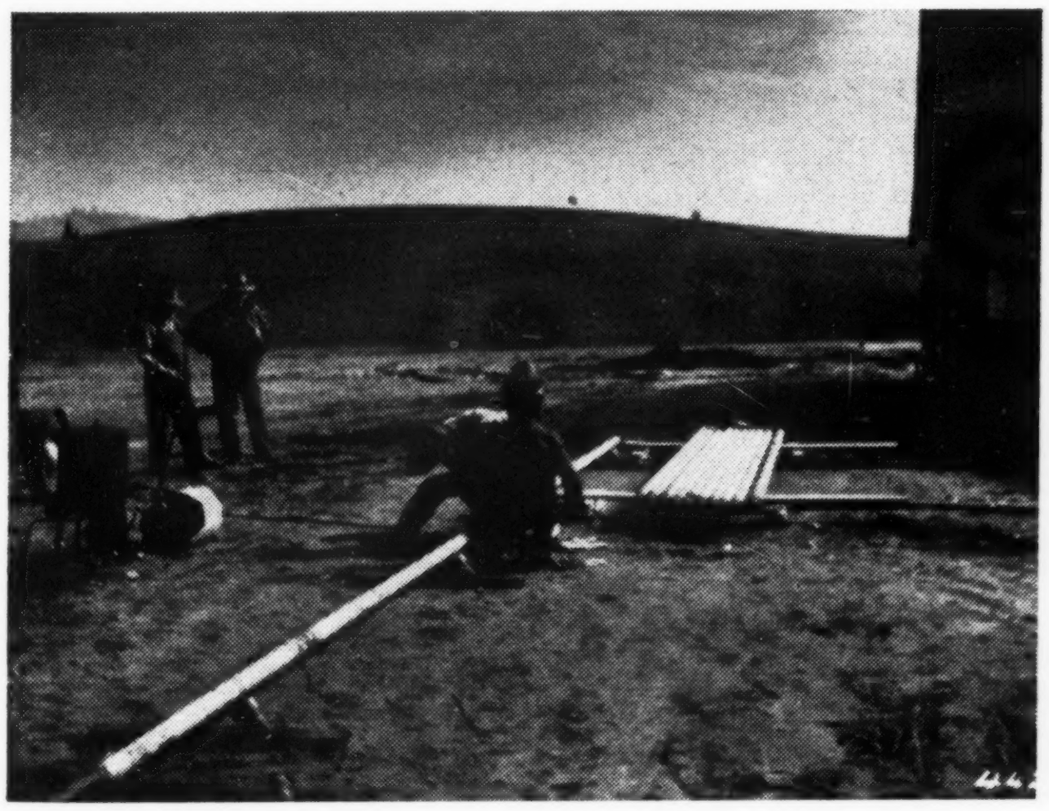
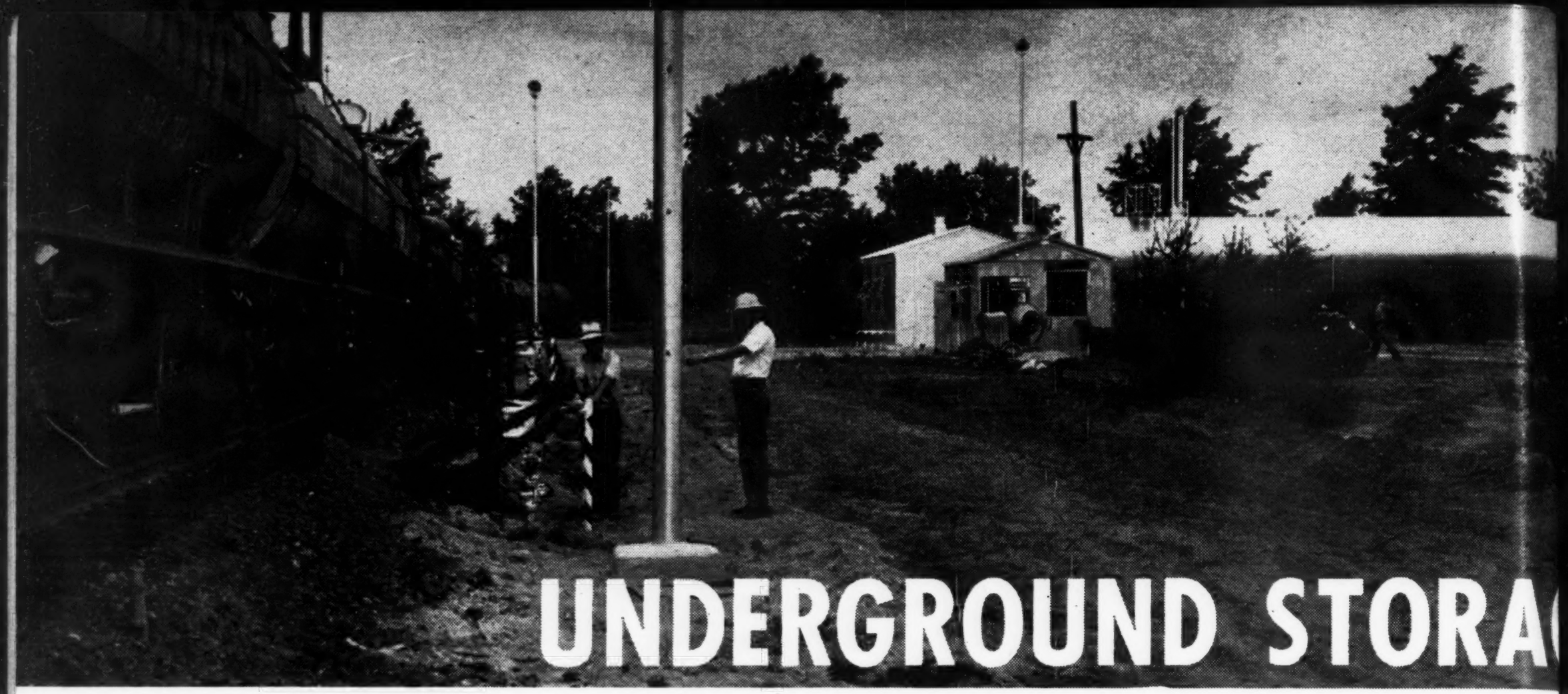


Photo shows stockpile from which pipe is rolled onto the rollers. The welder here is shown making rolling welds.

These are the two kinds of rollers referred to in the article, the type using four small ball transfers and the two-ball type.



UNDERGROUND STORA a P

By H. L. FRUECHTENICHT and JOHN B. SIMPSON

THE Michigan Gas Storage Co., a subsidiary of Consumers Power Co., Jackson, and Panhandle Eastern Pipe Line Co., normally receives large quanitites of gas from Panhandle for storage in its fields in Clare county, Mich., during the months from May to October, inclusive. It also receives gas in lesser quantities in April and November and that not needed for the daily demand of its customers is stored also. During the months of January, February, March and December, a minimum of 25 MMcf per day is received from Panhandle and the balance of the daily demand is taken from the storage fields. At the present time, Consumers Power is the only customer of Michigan Gas Storage Co., and its daily demand from the storage company in addition to its own supply from 10 Michigan fields varies from 20 MMcf per day in the summer to 100 MMcf per day in the winter. Michigan Gas Storage Co. divides its year into two parts; namely, input cycle from April to November inclusive, and output cycle from January to March inclusive, and the month of December.

Early in 1948 it was estimated that 12 billion cu ft of gas had to be stored during the input cycle of 1948 in order to meet the requirements of Consumers Power during the 1948-49 winter season and to replace the cushion gas which had been withdrawn during the winter of 1947-48. Careful studies of conditions in the storage fields showed that the fields should not be depleted below 375 psig without inviting probable damage to the reservoir. However, in order that service would not be curtailed and industry shut down during the winter of 1947-48 as it had been in other areas throughout the country, the Michigan Gas Storage Co. elected to continue full service to Consumers Power even though the pressure fell below 375 psig. As a result, the cushion was depleted to 334 psig.

In 1946 when it appeared that a natural gas shortage was inevitable, Consumers Power Co. started restricting its markets by complete curtailment of new space-heating customers, and in September, 1947, all industrial customers were placed on a quota basis (use restricted to that consumed during previous 12-month period), and both of these restrictions were still in effect as of March 31, 1949.

Dark Days

The shortage of steel made it impossible to enlarge the facilities of both Michigan Gas Storage Co. and Panhandle Eastern Pipe Line Co. in order that full contract amounts could be delivered to, and received by Michigan Gas Storage Co. The most optimistic view of the deliveries for storage expected during the 1948 input cycle revealed a probable shortage, in meeting the estimated market and cushion replacement requirements, in excess of 1 billion cu ft.

During the winter of 1947-48 when great demands were made upon the storage fields to avoid any curtailment of the restricted market served by Consumers Power Co., an increased amount of water was recorded in the wells of the storage fields. This water encroachment became greater as the pressure fell below 375 psig. While some damage may have been done to the storage fields when they were operating from 375 psig down to 334, the time the fields were operating at this lower pressure was of short duration. Any damage done is not believed at this time to have been permanent.

In order to meet this anticipated deficit, engineers of Michigan Gas Storage Co. and Consumers Power Co. studied various methods of obtaining additional gas. Sources of natural gas in Michigan were limited and no new discoveries had been made for several years, which made it impossible to secure additional local gas. Panhandle's capacity to make additional deliveries was found to be impossible at this time due to the material shortages already stated. High-Btu oil gas to be made in several existing emergency stand-by plants was considered, but the shortage of oil and operating difficulties forestalled this plan. Installation of peak-shaving propane-air units at principal distribution points was also contemplated, but the cost, amounting to several million dollars, was prohibitive and material shortages in this type of equipment were acute. There finally emerged from the above studies a plan to build one propane-air plant at the storage fields, having a capacity of 10,000,000 cfd of propane air, and mix propane-air gas with large amounts of natural gas and store the mixture underground. The plant could be built for approximately $250,000 because part of the necessary equipment, (compressors, boilers and mixing tower), was installed and available for quick conversion. This plan offered continuous operation of the propane-air plant and a uniform mixture immediately available for use when needed.

As far as could be determined, mixing propane-air and natural gas for underground storage on such a large scale had never before been attempted, and some questions were raised as to recovery, vaporization, condensation, interchangeability and hydrate trouble to be encountered. Each of these factors was investigated, and the theoretical conclusions showed the plan to be workable. Further mention of these findings will appear later on.

Approval for construction was giv-

Mr. Fruechtenicht is general superintendent and Mr. Simpson is engineer for Michigan Gas Storage Co., Jackson.

a Propane-Air and Natural Gas Mixture

Photos above show, at left, unloading rack with six unloading stations, one 30,000-gal storage tank, and two pump buildings; and at right, the mixing station, with storage tank and pump house in foreground and compressor building in background. Mixing tower is at left.

en June 3, 1948, and procurement of material and construction of the facilities started immediately. Construction included building a 1600-ft railroad spur, six unloading racks, and two steel buildings, and installing three vapor compressors, two liquid transfer pumps, and one 30,000-gal storage tank at the proposed unloading station. A 4-mile 4-in. pipeline, together with a 4800-volt, three-phase power line and a private telephone line, was built to connect the unloading station with the mixing station. The mixing station was incorporated with the natural gas compressor station injecting gas into the storage wells. A 30,000-gal storage tank, two high-pressure liquid transfer pumps, a steam heat exchanger vaporizer, and one 800-hp Clark two-stage air compressor were installed. One 800-hp Ingersoll Rand single-stage gas compressor located in the main compressor building was converted to a third-stage air compressor. One of the gas compressor station dehydration contact towers was changed to a propane-air-gas mixing tower, and the necessary steam and water connections were made. Air lines, aftercoolers, intercoolers, a carbon and fire arrester, and other auxiliary equipment were installed to complete the mixing plant. This type of material was in short supply, and delivery promises tended to be much later than the conditions would allow. However, because of the emergency nature of the program, suppliers, contractors and employees cooperated to the utmost to complete the job on or before the deadline set as July 15, 1948, or a total of six weeks' working time. For a diagrammatic plan of this system, see *Fig. 1*.

After the plant was completed and had settled into normal operation, six tank cars were unloaded at a time and the liquid pumped to the mixing station through the pipeline with the tank at each end acting as a surge tank and reservoir to allow flexibility in the unloading operation and the pumping rate. The propane in the storage tanks was used as a supply while the vapor was being removed from the tank cars and while tank cars were being switched to the siding or shuttled along the siding to the unloading points. At the mixing station the propane was then pumped to a steam heat exchanger for vaporization, and thence to the mixing tower.

Summer Procedure

During the warm summer operation, the propane was bypassed around the vaporizer as the heat of compression of the air and the natural gas furnished the heat for its vaporization. To vaporize 100,000 to 140,000 gal of propane per day from 70°F to 193° F at 540 psia requires from 75 million to 106 million Btu per day. Natural gas in being compressed from an average suction pressure of 200 psig to a discharge pressure of 525 psig gave an actual discharge temperature of approximately 170°F without aftercooling. The specific heat of gas accounts for 24 Btu/Mcf/°F temperature change and thus 40 to 60 MMcf of gas in being cooled from 170° to the injection temperature of 70°F gave 95,000,000 to 144,000,000 Btu/day available from gas compression. The third-stage air in being compressed from 90 to 475 psig had an actual discharge temperature of approximately 375°F and about 35,000,000 Btu/day were available from air compression. When operations started, neither the natural gas nor air was aftercooled before mixing with the propane. However, operation proved that vaporization, by passing this hot gas-air mixture through the propane or the bubble trays in the mixing tower, did not follow the heat balance equations as the gas and air passing up through the liquid propane had a considerable atomizing or mist action. It was found that an inlet temperature of air and natural gas of 90°F regulated by the amount of aftercooling was all that was required to give the 70°F temperature desired for injection into the wells.

Air was furnished by one two-stage Clark RA8 intercooled compressor taking 6 MMcf of air per day from atmospheric pressure and delivering the air at 90 psig to an aftercooler and then to one Ingersoll-Rand KVG 800-hp single-stage compressor. The third-

TABLE 1. AVERAGE OF SPOT CHECK ANALYSES

	Natural Gas %	Mixture To Fields %	Mixture From Fields %
Nitrogen & Non-condensables	11.3	15.3	13.6
Oxygen	0.2	2.3	Trace
Methane	74.7	65.5	72.0
Ethane	13.7	5.8	6.6
Propane	.....	10.9	7.0
Butane	.....	0.1	0.6
Carbon Dioxide	0.1	0.1	0.2
Total	100.0	100.0	100.0

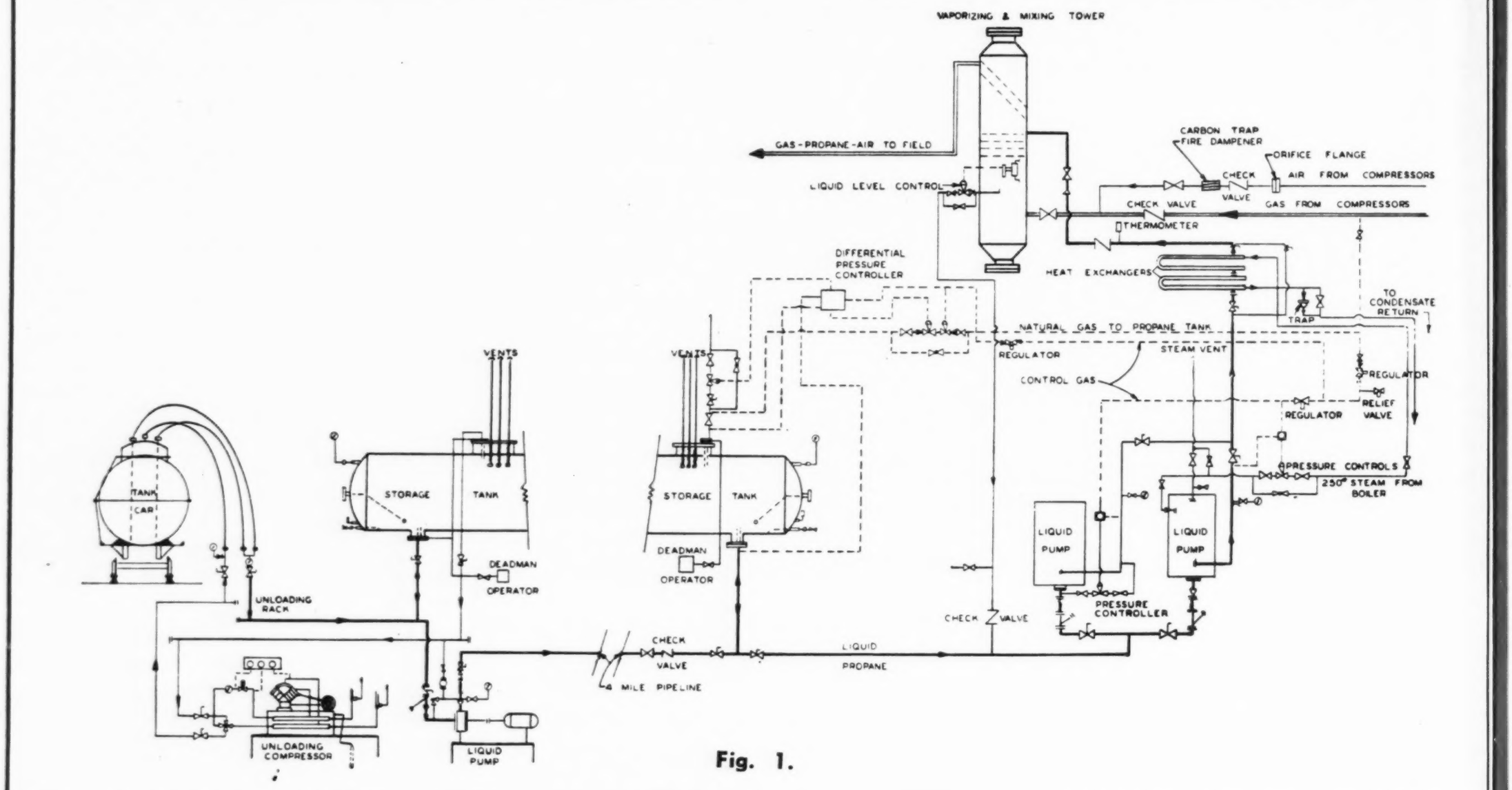


Fig. 1.

stage air was discharged at the same pressure as the discharge pressure of the natural gas going into the storage fields. The air merged with the natural gas just before it entered the mixing tower and then the mixture of natural gas and air bubbled up through the liquid propane. The resultant mixture of propane-air-natural gas leaving the mixing tower entered the field gathering system and passed down through the wells into a sand reservoir lying approximately one-quarter of a mile below the earth's surface.

The general properties of the mixture were as follows: from 100,000 to 140,000 gals of propane were mixed with 40 to 60 MMcf per day of dry natural gas of 0.685 gravity and 1000 Btu and then enough air was added to bring the mixture back to approximately the same Btu content—1000. At the higher rates of propane use, 140,000 gal or more, the 1000-Btu standard could not be maintained, as the air compressor capacity was limited to 6 million cfd. The pressure on the mixture varied from 400 psig to 525 psig in being compressed and stored in the field. The bottom hole or reservoir temperature was 60°F. The vapor pressure of the propane at this temperature was approximately 92 psig. The propane-air varied from approximately 15 to 25% of the total mixture and the propane varied from 6% to 11%. Partial pressures due to the pressure of propane varied from 31 psig to 58 psig and the propane therefore never condensed, either in the field lines or in the wells, and no liquid propane has been found in the wells or gathering system drips to date. The averages of spot-check analyses of the natural gas and of the mixture to and from the storage fields are shown in *Table 1.*

Curves

A hydrate equilibrium curve as experienced for the straight natural gas and also for the normal propane-air-natural gas mixture is shown as *Fig. 2.* For straight natural gas at 540 psia the hydrate equilibrium point is shown on curve A as approximately 49°F and in normal operation little trouble is encountered except at the wellhead or wellhead drip, where there are restrictions with their subsequent cooling effect. An insulated wellhead house and indirect heater counteracts this cooling effect by maintaining a uniform temperature. The hydrate equilibrium point for the normal propane air-natural gas mixture at 540 psia as shown on Curve B is approximately 56° F. Some hydrate trouble was expected with the storing of the mixture and consequently the wellhead temperature was maintained at or above 70° F. Out of a total of 293 storage wells some hydrate trouble was experienced in 37 wells. Temperature surveys in the wells revealed that a temperature of 49° F was present at a depth between 600 and 700 ft and then rose gradually until it reached 60 to 62° F at approximately 1335 ft. In these 37 wells, hydrate bridges formed anywhere between 150 ft and 700 ft below the surface in the well bore and effectively blocked the flow of gas. Neither the use of alcohol bottles nor the shutting in of the well removed the bridge and the only effective method found was to open the well to atmosphere and let it blow the hydrate bridge out. The hydrate bridges occurred more frequently when an insufficient amount of air was added to the mixture to maintain the 1000 Btu heating value. By some experimentation and review of previous operating data, an upper limit of 1030 Btu was set as the maximum allowable point, and little hydrate trouble was experienced thereafter. The only control on the Btu range was the amount of air added to the mixture, and it was limited to 6 MMcf per day. Some shipping delays necessitated a greater input on propane than was originally planned and it was at these high input periods that trouble was experienced.

The high input rate of propane occasioned by the shipping and switching delays also created another problem. At times as many as 18 cars a day were unloaded instead of the 12 cars originally planned, and the time spent in removing the vapor from the cars became a limiting factor. During the hot weather the propane vapor being pumped from the tank cars would not reliquefy fast enough, and the tank pressure would rise above 200 psig, thus causing the relief valve to open. It was not possible nor feasible to install a refrigerating unit, so a water spray was attached to the tank using the relatively cold ground water, and this helped to reliquefy the propane to a marked degree. This speed of unloading and vapor trouble necessitated leaving many cars with 40 to 50 psig of propane vapor to go back to the shipper and increased the losses above those normally expected.

When the gathering system was installed in the field, it was not cleaned

by the use of a pig but was only purged and blown. The high rates of reverse flow and the oxygen content of the propane air-gas mixture caused old scale to flake off and some new iron oxide to form. It would fall off and then be carried to the wells, and in some instances, wells had to be blown to remove it.

With a compression ratio of 5.2 existing at times in the Ingersoll-Rand third-stage air compressor, temperatures actually reached 375°F or more. Excess oil in the compression cylinders formed particles of red hot carbon on the valves and deposited some oil in the air line. The carbon particles broke off and ignited the oil, causing fire inside the air pipeline and raising the temperature of the air going to the mixing tower in excess of 450°F. Careful regulation of lubricating oil did not entirely remove this hazard, so an aftercooler was installed and the air was cooled to 100°F. A fire dampener and carbon arrester was originally installed just ahead of the air-gas mixing point to keep any fire from the gas and propane. The total oxygen content of the mixture was 5% as a maximum, and 17.7% was required to support combustion so no fire in the mixture was possible. The aftercooler installed at this time, together with the intercoolers originally installed, removed a considerable amount of water from the air and helped to reduce the quantity of water in the mixture stored in the field. It also offered another means of temperature control.

To keep the high pressure liquid propane positive displacement pumps from vapor locking in the suction valve ports, it was necessary to increase the suction head. A natural gas pressure of 10 to 40 psig in excess of the vapor pressure of propane was imposed upon the mixing station storage tank by means of a differential pressure controller.

Interchangeability of the propane air-natural gas mixture with straight natural gas was calculated to be allowable at 7% of 1000 Btu propane-air in the mixture as shown in *Fig. 3*. However, experimental testing indicated a higher allowable per cent mixture and it was believed that little trouble would be experienced with as much as 18% propane-air in actual practice. It was determined that trouble in utilization would not develop until propane air content reached 21%.

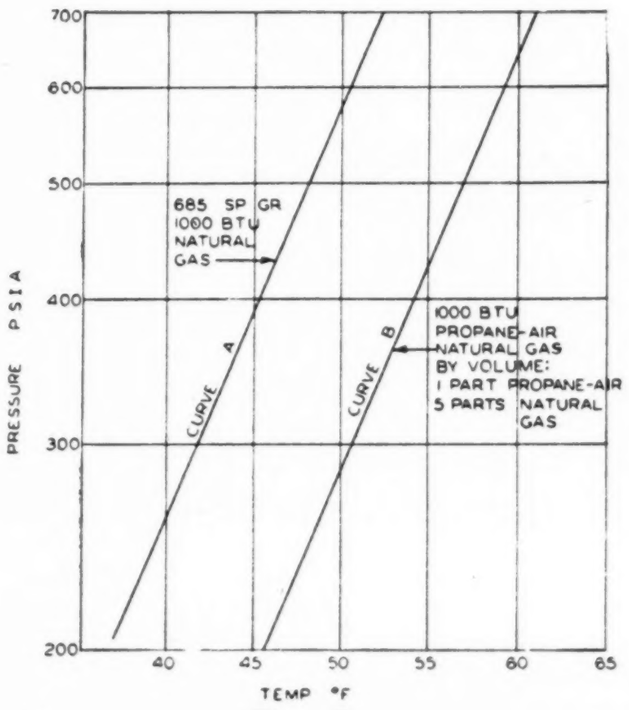


Fig. 2.

From July 15 to Nov. 1, 1948, a total of 1194 cars containing 11,570,900 gal of propane was handled. Losses due to various causes amounted to 427,520 gal; therefore, 11,143,380 gal of propane were vaporized and mixed with 556,358,000 cu ft of air to make 960,000 Mcf of propane-air gas with an average Btu content of 1060. This was mixed with 10,660,000,000 cu ft of natural gas to give the resultant propane air-natural gas mixture a Btu value of approximately 1007 and a specific gravity ranging from 0.720 to 0.790.

Volumes Handled

From Dec. 13, 1948, to March 13, 1949, a total of 273 cars containing 2,783,920 gal of propane was handled. Losses due to various causes amounted to 16,275 gals; therefore, 2,767,645 gal of propane were vaporized and mixed with 210,822,000 cu ft of air to make 310,990,000 cu ft of propane air gas with an average Btu of 812. This was mixed with the propane air-natural gas mixture coming from the storage fields, and the resultant mixture transmitted to markets averaged 1000 Btu. These two operations meant that most of the natural gas received from Panhandle during the summer for storage was enriched twice with propane. During this second period the propane air percentage of the mixture transmitted to market at times rose as high as 22% at 1000 Btu. At this percentage, some trouble was experienced with reducing atmosphere process furnaces, raw gas pilots, and a few home refrigerator burners; however, service calls were not great in number and there were very few repeat calls. Higher gravities reduced the input to burners somewhat and, in the case of space heating equipment, failure to adjust for higher gravity resulted in slightly lower efficiencies. The mixture caused no other troubles and was used all winter.

During the winter some modification in the plant layout was necessary for good operation during the cold weather which, at times, reached minus 20°F. The mixing tower was changed back to a dehydration contact tower to prevent hydrate trouble in the transmission system. The propane was vaporized entirely by the steam heat exchanger and discharged into the suction of the gas compressors. No change was made in the air piping. During this type of operation the vaporization followed the heat balance equations perfectly, and it was temporarily necessary to install an oil field boiler to supply steam to the heat exchanger.

During the output cycle, the composition of the gas was tested by Podbielniak analysis periodically and no really significant changes between the mixture put in storage and the mixture withdrawn from storage has been noted. The specific gravity of the gas coming from the storage fields has been a good index of the propane air-natural gas mixture being recovered. It is estimated that by the end of March, 1949, all of the propane-air gas would have been recovered from the fields except for a small amount which has diffused with the cushion gas.

The total cost of the propane plant except for that material and equipment on hand and available for conversion and use was $252,000. The cost of the 14,354,820 gal of propane, including freight to unloading station, was $1,576,100. The operating labor, material and supplies, and fixed charges amounted to $266,900. The total cost of the approximately 1,271,000,000 cu ft of propane air gas was $1,843,000 or an average cost of $1.45 per Mcf.

The Michigan Public Service Commission approved the propane project to prevent a gas shortage during the winter 1948-49 and issued an order allowing Consumers Power Co. to add a surcharge to the bills of customers for all gas used in excess of 2500 cu ft per month in order to pay for the increased cost of this emergency gas. The surcharge amounted to 14½ cents per Mcf of gas above the minimum.

All evidence shows that this project was highly successful and as a result no customer was curtailed in his use of gas beyond the restrictions already in force.

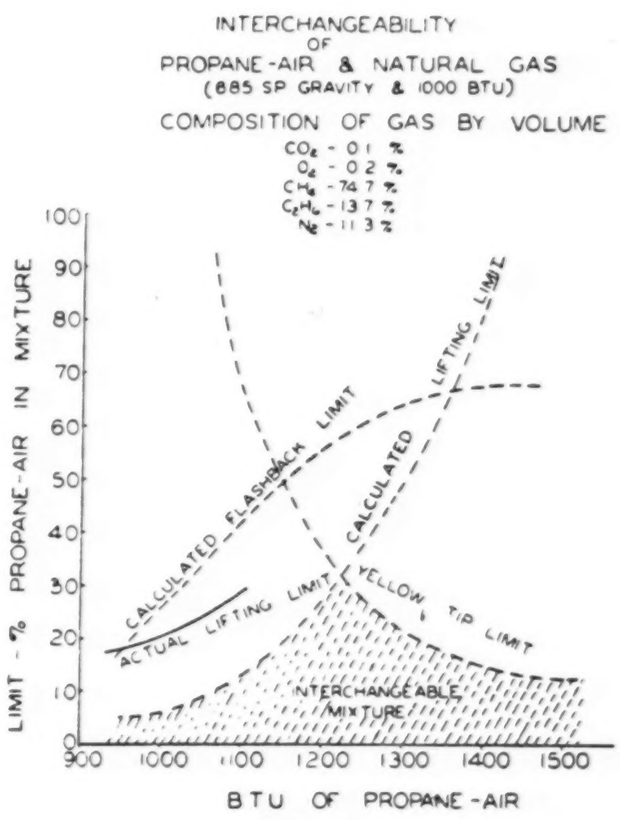


Fig. 3.

WRINKLES AND GADGETS THAT CUT COSTS

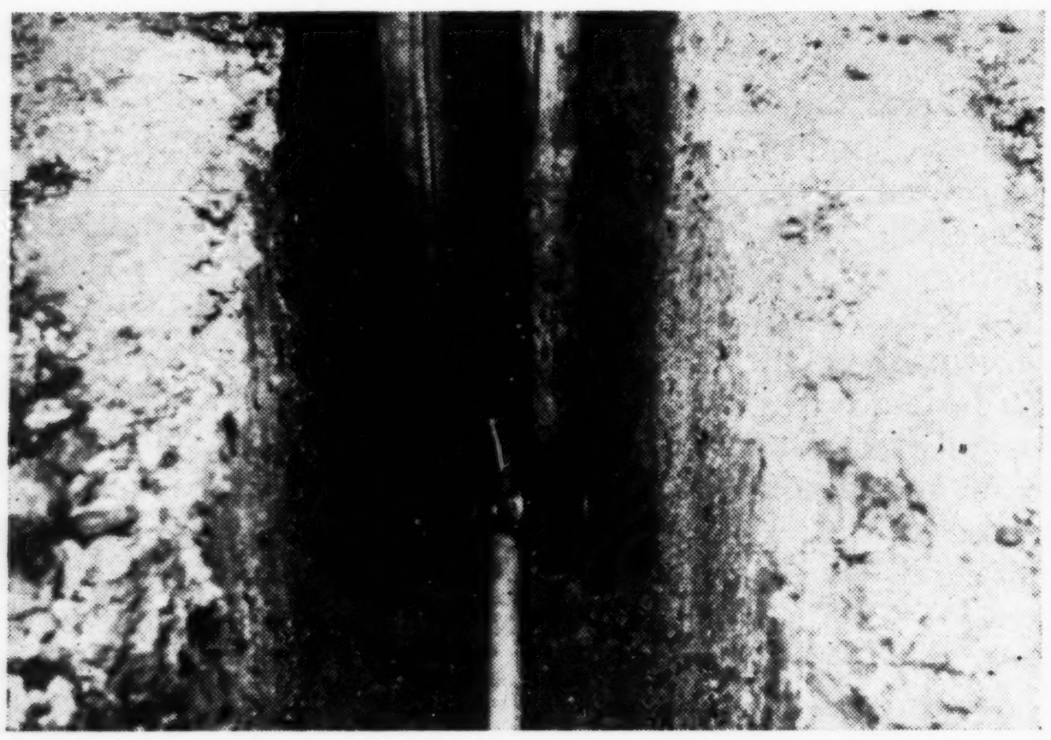
Pipe jack mounted on rear end of truck is used to expedite street crossings, enabling crew to cut street crossing time to one-fourth.

AT a planning meeting for the 1948-49 Southern Gas Assn. program, it was debated whether the SGA should prepare a booklet on gadgets and wrinkles on natural gas. As an alternative, J. H. Collins Sr. then suggested that the association might make a film setting forth the wrinkles and gadgets of member companies.

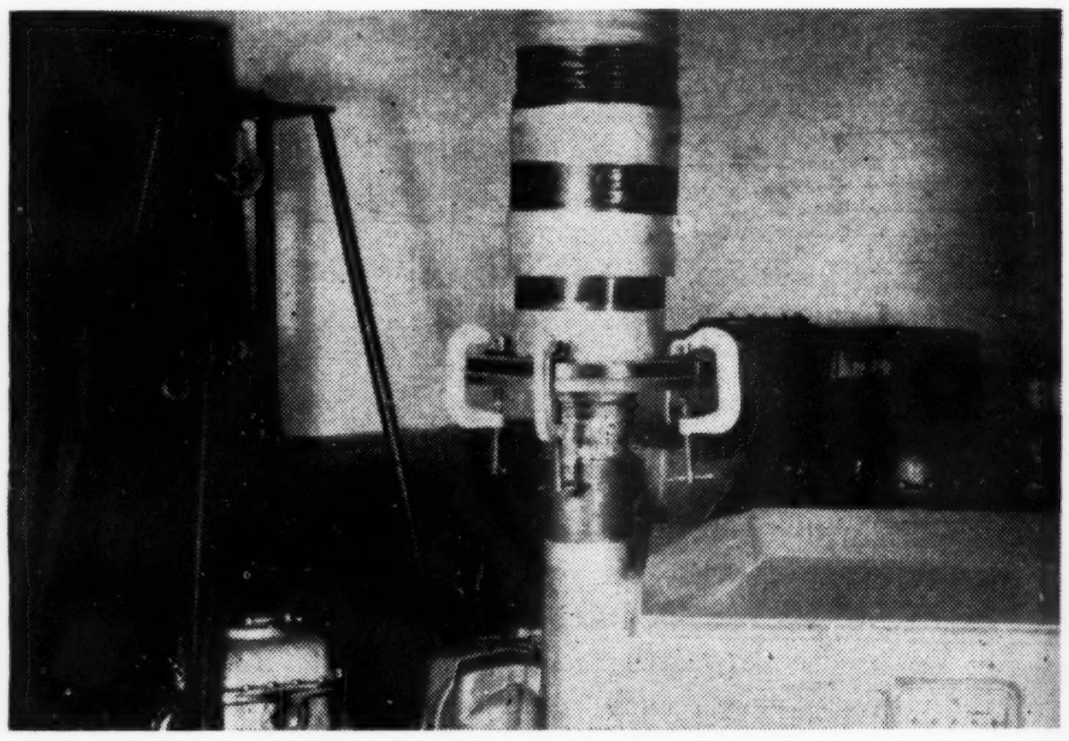
As a result of this suggestion, C. H. Zachry, president of the Southern Union Gas Co., Dallas, and a past president of the SGA, agreed to sponsor this project. J. H. Holmes, gas engineer, New Orleans Public Service Inc., assisted Mr. Zachry.

In response to requests, 11 companies forwarded 283 pictures. From the slides received, two films were made. No. 1 runs for 40 minutes and totals 129 slides covering 30 subjects. Film number two runs for 25 minutes and includes 58 slides covering 20 subjects.

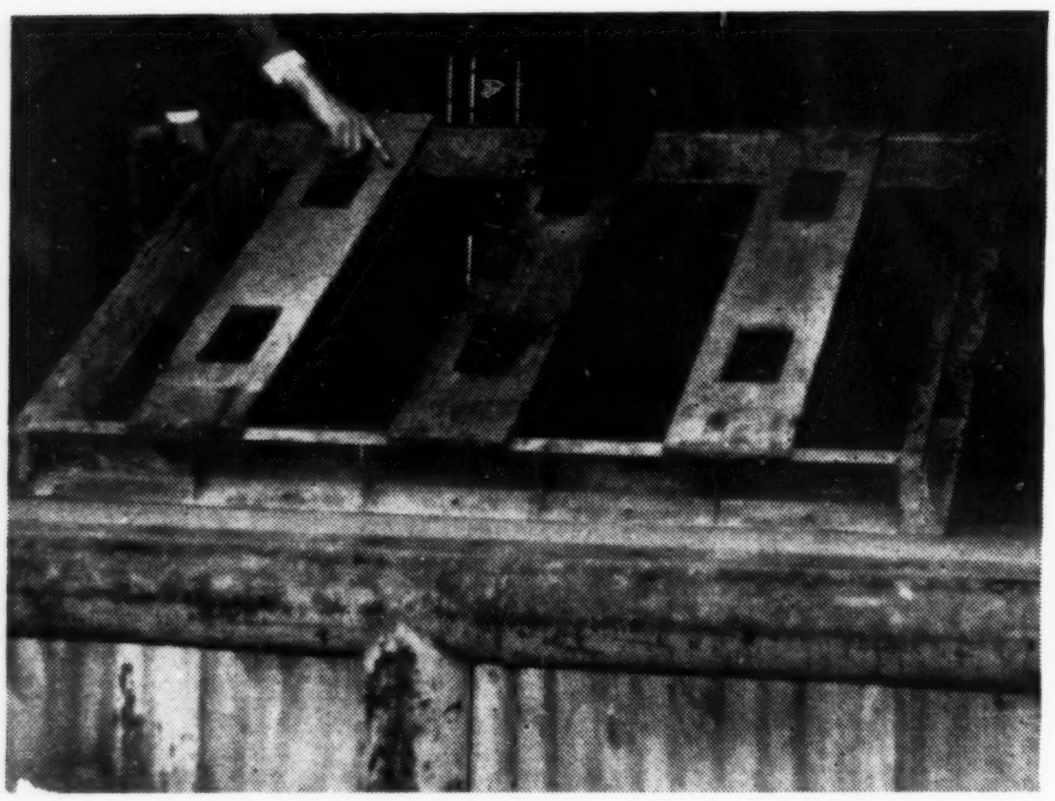
Film No. 1 was shown at the operating section session at the convention in Biloxi, April 21. It is from this film that the wrinkles and gadgets published on these pages were selected, and made available through the courtesy of Mr. Zachry, Mr. Holmes, and the association.



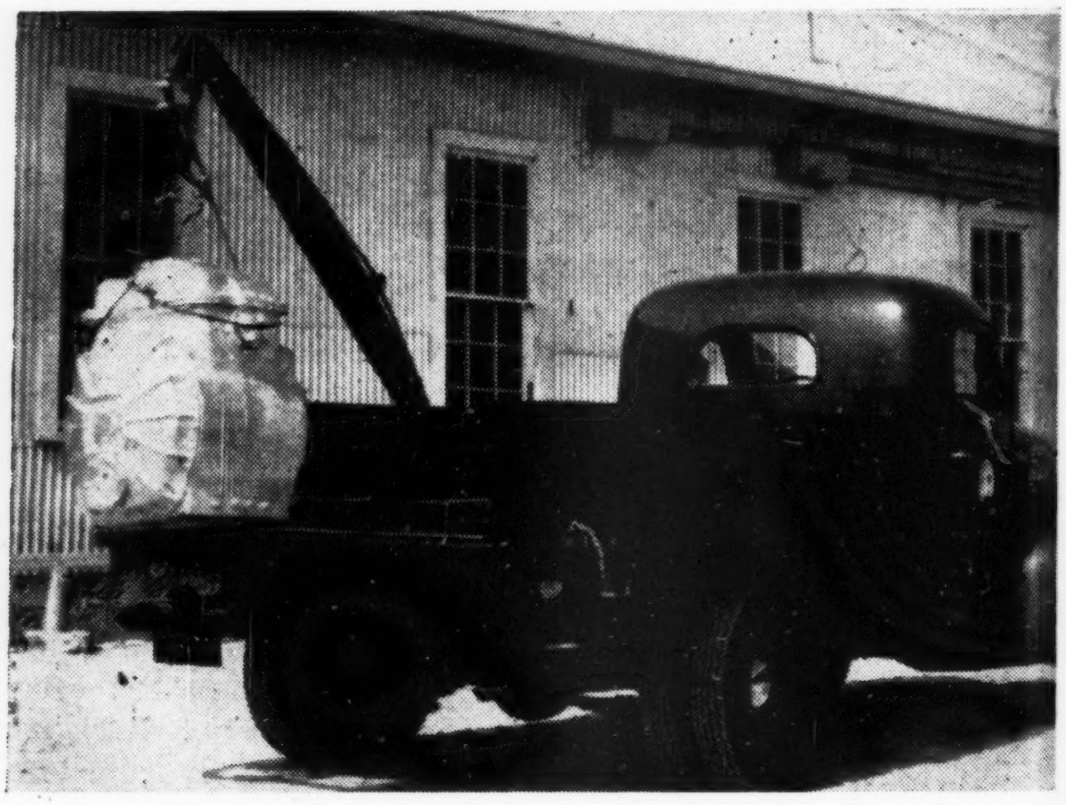
Close-up of the pipe and jack described in the photograph above, showing their relative positions in the street-crossing operation. Pipe is shown partially pulled under the street. An average 40-ft crossing can be made, using this method, in approximately 40 minutes.



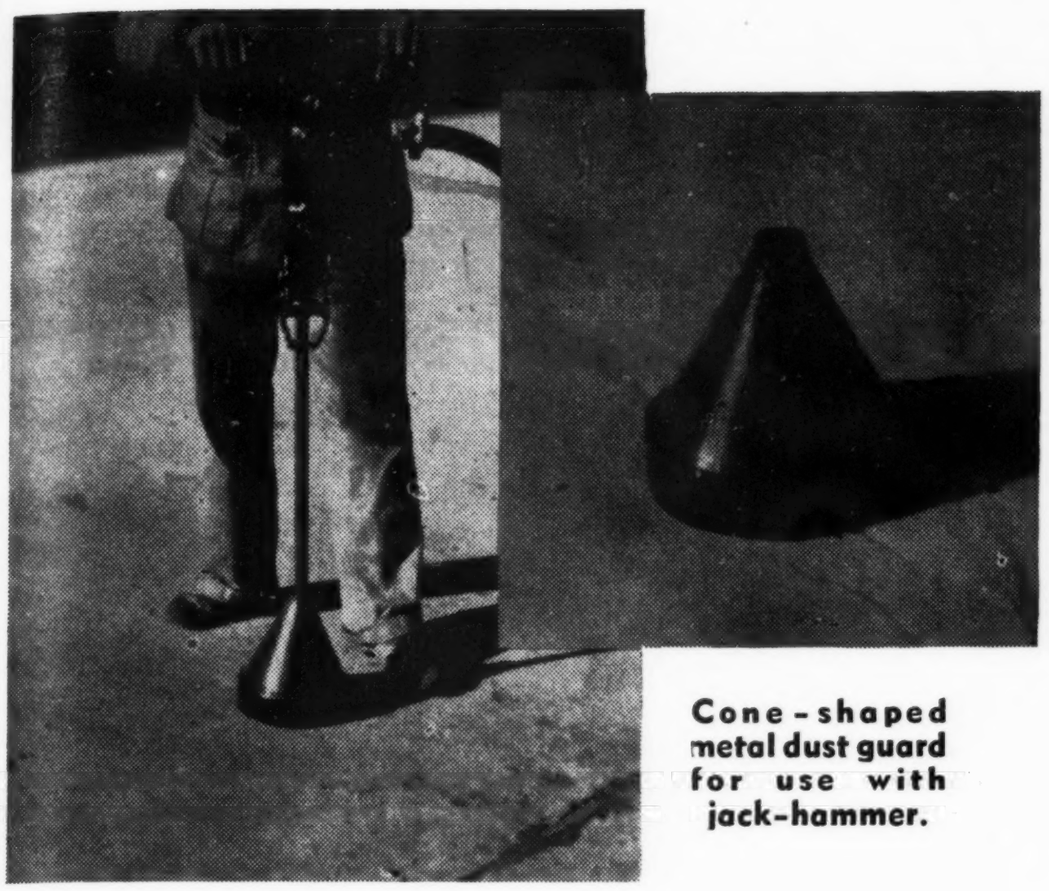
A unique application of carpenter's "U" clamps, using them as quick couplers for prover testing of large meters. The clamps are permanently attached to a flange by spot welds, swinging upward for disengagement, and eliminate need for bolting flange during the performance of the test.



Form, 64 in. long, 48 in. wide, 5 in. deep, of reinforced and spotwelded steel, used to build cooling tower base for Servel air conditioning jobs. Collapsible, bolted at ends. After mix is poured, redwood templates are bolted in place, bricks laid in openings to exact specifications for each job.

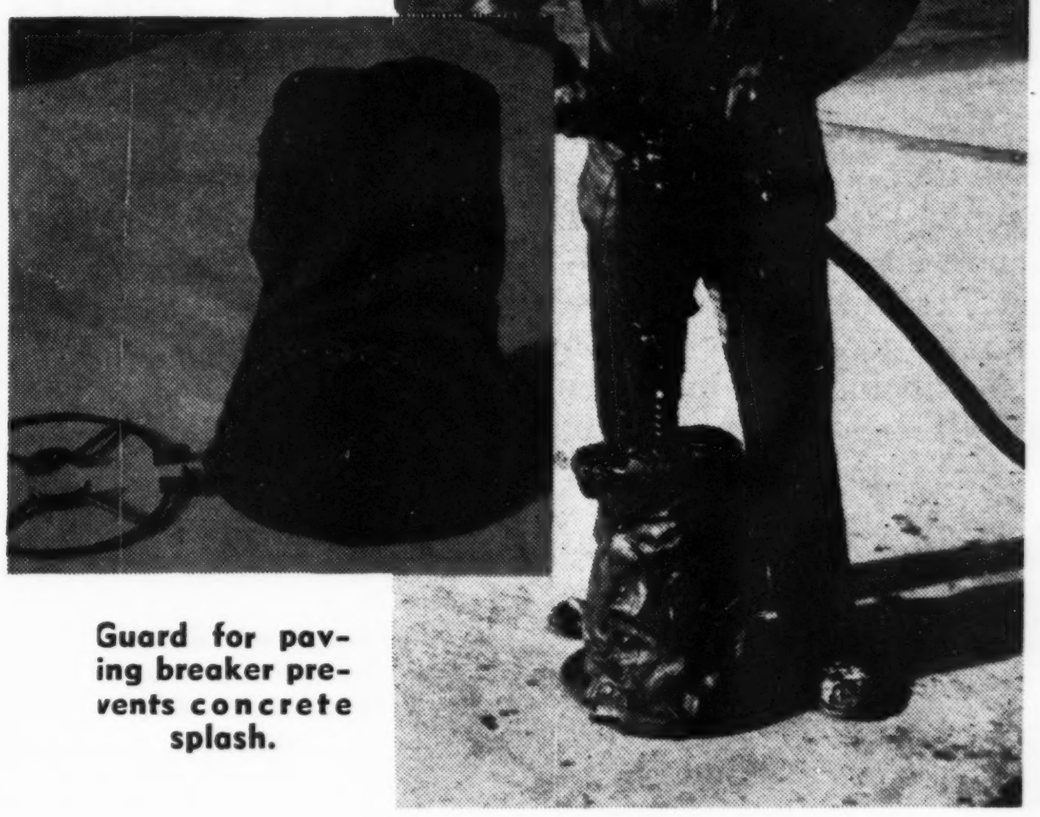


Self-loading boom loads large positive meters. Mounted on 1-ton truck for changing 60 and 80-light meters, Emco #3 and #4, 250 or 500-B meters. Boom mounted on ball-bearing base runs in channel from cab to rear of bed; may be used without power winch by increasing boom length 18 in. and using chain hoist. Boom can lay flat if pins are removed.



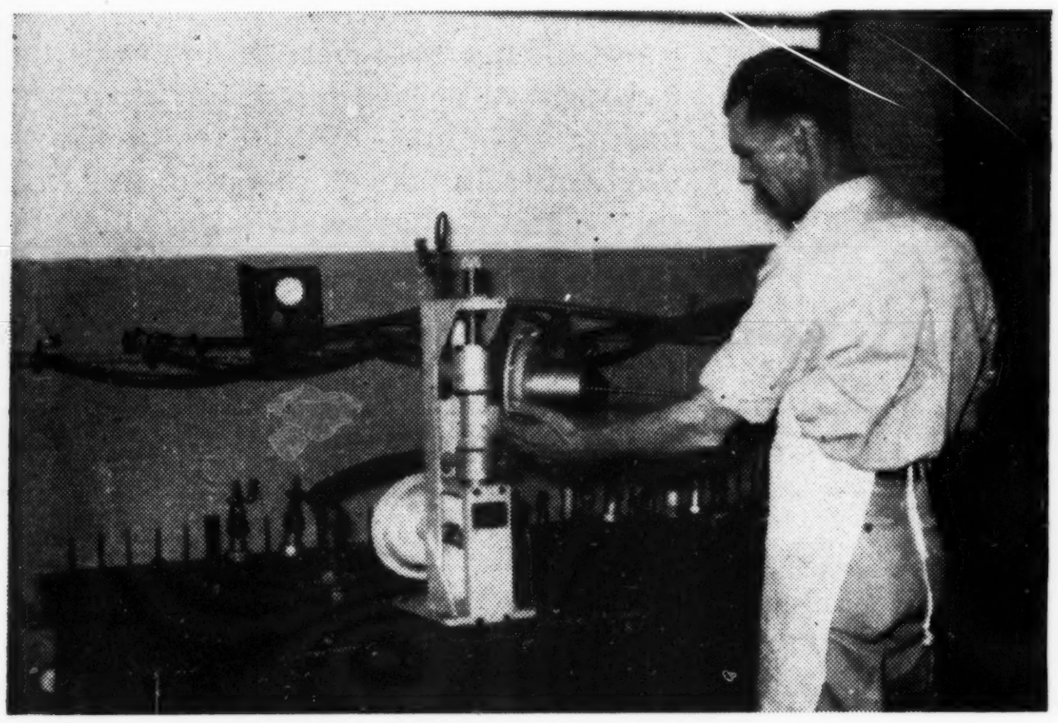
Cone-shaped metal dust guard for use with jack-hammer.

Metal dust guard shown in use. It prevents dust from being blown upward when air jet is used to blow concrete dust from hole being drilled. It is most useful in commercial areas.



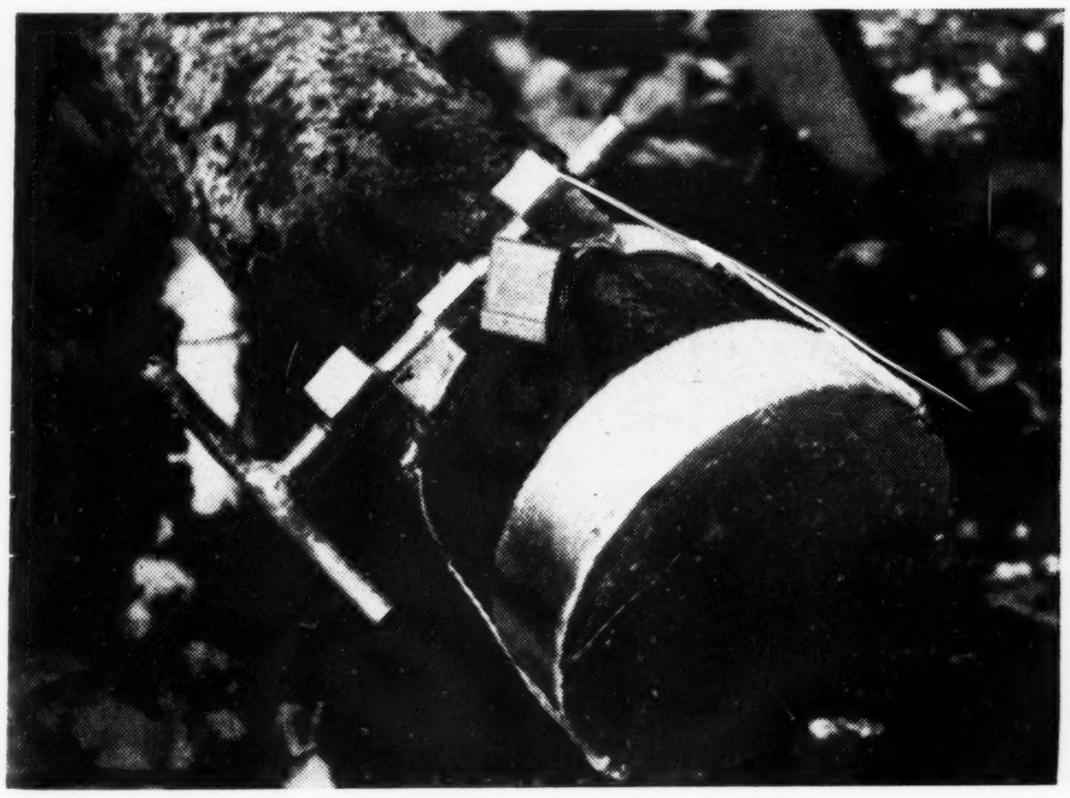
Guard for paving breaker prevents concrete splash.

Canvas guard shown in operation. It is used chiefly where men are working close together, and in areas where pedestrian traffic is heavy. It also protects plate glass windows.



Regulator test stand holds regulator securely by means of air pressure, so that repairs and adjustments can be made after unit has been overhauled. Air connection on test stand affords means of testing and adjusting regulator while it is still clamped in place in the test rack.

This portable electric generator weighs only 9 lb. Driven by a small air motor, it develops 150 watts of power. Equipped with extension cord and vapor-proof lamp, it is used by emergency repair crews, supplementing dry-cell battery lights and truck spot light which are regular equipment.



Device for closing open end of pipeline during construction. For use as a temporary closure to keep out foreign matter, it saves the time necessary to weld a plate over the end. A padlock fastens it securely to the pipe, preventing removal while the lock is in place on the device.

Tool box on serviceman's truck fits just back of cab. Measuring 24 x 20 in., it is of sheet metal. Lid breaks into two sections, hinged in the middle, for access from two sides, and has auto door handles. Spring-loaded latches lock three rolling drawers in position when the truck is in motion.

I. THE SEARCH FOR A TRACER SUBSTANCE

THE quick, simple, and sure location of natural gas leaks in underground piping never can fail to be of interest to the gas distribution industry. The majority of gas leaks usually can be located by existing methods, the principal one in current use probably being the combustible gas indicator. However, complex situations arise such as where field gas is present, where several gas lines are in close proximity, or where a leak may have existed for a long period of time, the gas having collected beneath a large paved area and showing a rather uniform concentration throughout the area. In such circumstances one is interested in detecting and identifying gas coming from one particular gas stream in the possible presence of gas from other sources. If a tracer, some easily detectable unique substance not ordinarily found either in the gas stream or in the surroundings, could be introduced into the suspected gas line it would then be possible to locate positively gas leakage from a specific line in the presence of gas from other sources.

The requirements for a substance to be suitable for use as a tracer for leakage detection in a gas distribution system may be outlined briefly as follows:

1. The tracer must commingle with the gas stream at the usual temperatures and pressures to be encountered in the pipe. This establishes that the tracer should be a gas.
2. The tracer should be unique, i.e., it should not ordinarily be present in the gas stream, or in field gas (natural gas seeping to the surface from underground gas fields), soil, manholes, etc.
3. It should not react chemically with any of the components of the gas stream or anything liable to be found in the pipe or the soil.
4. There should be no appreciable physical adsorption or solution of the tracer by the pipe walls, soil, or water. In general, the lower the critical temperature, the boiling point, and the molecular weight the less a substance will be removed by surface adsorption.
5. A tracer should be a substance which will not interfere with the normal use of the gas. It should not be toxic or corrosive.
6. The tracer should be capable of reliable detection in low concentrations in the presence of all the usual components to be found in the gas stream and the soil. This factor minimizes the quantity of tracer that need be introduced into the gas stream and facilitates detection of small leaks.
7. For practical reasons a tracer should be relatively inexpensive and readily available.

As a first approximation, the specific requirements of a suitable tracer for use in a natural gas distribution system may be reduced to a search for a gas having a critical temperature, boiling point, and molecular weight as low or lower than ethane. Such a gas would not tend to be strongly adsorbed by the pipe walls or in passing through the soil and would probably diffuse through the soil at least as fast as ethane. It appears that there are probably fewer than 20 gases that even approach meeting this initial requirement (see *Table 1*).

Of this group all but five—hydrogen, helium, neon, acetylene, and ethylene—can be eliminated immediately because they are too reactive and corrosive, poisonous, or are already present as constituents of natural gas. Hydrogen would probably be an almost ideal tracer gas, particularly because of its high rate of diffusion. Unfortunately, there is no suitable method of detecting it in trace quantities.

Helium would also be a good tracer gas. It can be detected in trace quantities by a mass spectrometer. This laboratory has conducted tests using helium as a tracer gas and employing the portable mass spectrometer manufactured by the Consolidated Engineering Corp. of Pasadena, Calif. However, at the present time even the portable mass spectrometer is such a large, delicate, and expensive piece of equipment that it does not readily lend itself to field use as is required for leak detection work.

Neon must be removed from consideration on the basis of its high cost and lack of a ready means for its detection. Ethylene would be a suitable tracer except it is difficult to test for in small quantities. Thus by a process of elimination we are left with acetylene, which fortunately has in sufficient measure the necessary attributes of a tracer gas.

In addition to the foregoing, consideration has been given to the use of some of the short-lived radioactive isotopes for use as tracers in a gas stream. Equipment is available for their detection in minute quantities and with the continuing development in this field this method may warrant further investigation.

TABLE 1. SUBSTANCES CONSIDERED FOR USE AS A TRACER

Substance	Molecular Weight	Boiling Point, °C.	Critical Temp., °C.	Reason for rejection as a tracer gas
Hydrogen	2.016	—252.8	—239.9	No sensitive test
Helium	4.003	—268.9	—267.9	Detection equipment bulky, expensive, delicate
Methane	16.016	—161.5	— 82.5	Constituent of natural gas
Ammonia	17.03	— 33.35	132.4	Very reactive; found in soil
Water	18.02	212.0	374	High boiling; found in soil
Hydrogen fluoride	20.01	19.4	230.2	Extremely reactive
Neon	20.18	—245.9	—228.7	No sensitive test; expensive
Acetylene	26.04	— 88.5	36.0	
Hydrogen cyanide	27.03	26.0	183.5	Very poisonous
Boron hydride	27.69	— 92.5	.....	Decomposes with water
Carbon monoxide	28.01	—190	—139	Very poisonous
Ethylene	28.05	—103.9	9.7	No sensitive test
Nitric oxide	30.01	—151.8	— 94	Reacts with oxygen
Formaldehyde	30.03	— 21	.....	Very soluble in water
Ethane	30.07	— 88.3	32.1	Constituent of natural gas
Methyl amine	31.07	— 6.5	156.9	High boiling point—reactive
Methyl alcohol	32.04	64.65	240	High boiling point
Silicon tetrahydride	32.09	—111.8	— 3.5	Reacts with air and water

Data from: Perry, J. H.; Chemical Engineers' Handbook, 2nd Ed., McGraw-Hill Book Co., Inc., New York, 1941.

ACETYLENE as a natural gas leakage tracer

By F. V. WILBY

II. EXPERIENCES WITH ACETYLENE

ACETYLENE has never been detected in natural gas nor is it usually present in the soil. However, acetylene would not be suitable for use as a tracer in manufactured gas or mixed natural gas and manufactured gas, since gas formed by pyrolytic reactions is likely to contain appreciable quantities of acetylene. A survey of the known reactions in which acetylene may engage indicates that there is little possibility of the presence of any substances in the gas stream, the pipe, or the soil which will react with or considerably absorb or dissolve acetylene. Acetylene is only slightly soluble in water, one volume of water dissolving one volume of acetylene. At ordinary temperatures acetylene spontaneously takes part in relatively few chemical reactions. It reacts with sulfuric and halogen acids and with vigorous oxidizing agents such as the free halogens, ozone and alkaline potassium permanganate. It also reacts with some of the heavy metallic ions such as silver, copper (ous), mercury (ic), palladium (ous), and gold (ic). The critical temperature, boiling point, and molecular weight of acetylene are close to those of ethane and it would be expected physical adsorption in passing through the soil should not be serious.

Toxicity

Acetylene is considered as being only a moderately poisonous gas acting as a simple asphyxiant and anesthetic. Concentrations up to 10% of acetylene in air can be tolerated for one hour without serious disturbance. When acetylene is employed as a tracer gas the maximum concentration in the gas stream will usually be less than 1% so its toxicity may be considered as negligible under these conditions. In these proportions the presence of acetylene in natural gas appears to have no appreciable effect on the operation of gas appliances.

Tests in this laboratory have shown that acetylene can be reliably detected in concentrations of the order of one part per million by means of its reaction with a solution of silver nitrate to form a white precipitate of silver acetylide.

Acetylene is a relatively inexpensive gas and is readily available, being carried on the street repair crew trucks for welding. On the basis of all the foregoing considerations acetylene was chosen as being the most suitable tracer gas available at the present time.

Our experience with this method has shown that the injection of from 0.05 to 0.01% acetylene into the gas stream is sufficient to insure leakage detection. The acetylene concentration is not critical and, depending upon conditions, probably could be allowed to range from 0.05 to 10.0%.

Two Methods

A gas distribution system may be divided into two general parts, the distribution mains which distribute the gas to the ultimate consumer at relatively low pressures of from 8 in. of water to about 10 psig, and the trunk lines, which carry large volumes of gas at pressures ranging to 100 psig and more. Methods for metering acetylene into both types of gas lines were developed.

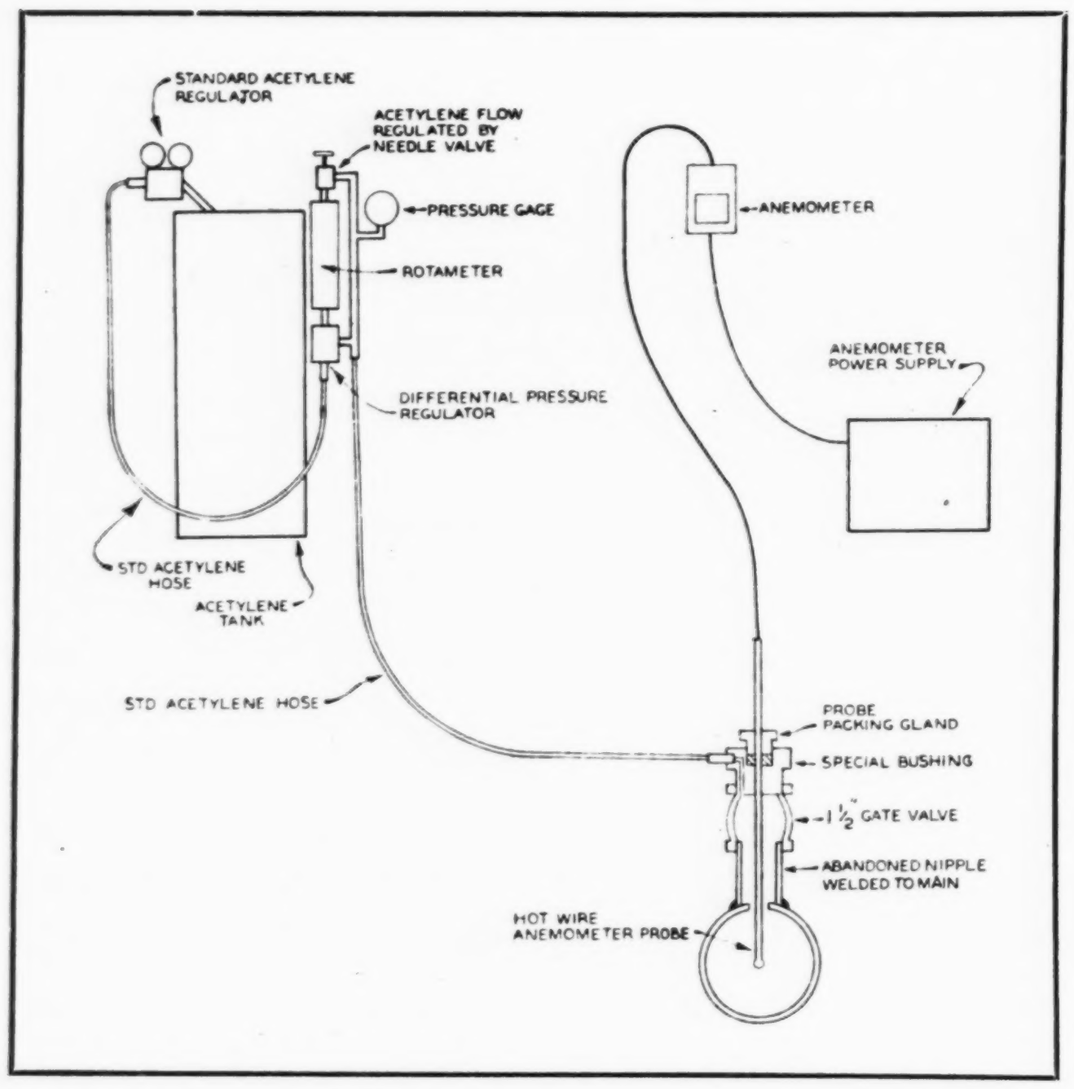
The method for injecting acetylene into the distribution mains is shown in *Fig. 1.* It is necessary to know the direction of gas flow to insure the acetylene being carried through the suspected area, and it is desirable to know approximately the rate of gas flow in the line so that acetylene may be injected in the proper proportion. In the event the rate of gas flow is very low it may be desirable to increase it by venting gas at some appropriate downstream point. In distribution gas mains the rate of flow may sometimes be determined by totalizing the meters fed by the distribution line. For use in the event no means is available for determining the gas flow in the main, a method was developed to measure the gas velocity by means of a hot wire anemometer. The anemometer probe is introduced into the gas stream through a 1½-in. abandoned nipple that has been welded to the main. The acetylene can be injected into the main through the same abandoned nipple. When the rate of gas flow has been determined, the acetylene is metered into the line by a rotameter, the rate of flow being maintained constant by the differential pressure regulator regardless of pressure changes in the acetylene tank or gas main. It is usually desirable to inject the acetylene for a period of several hours to allow it time to diffuse through the soil and with this apparatus a constant injection rate may be maintained with a minimum of attention.

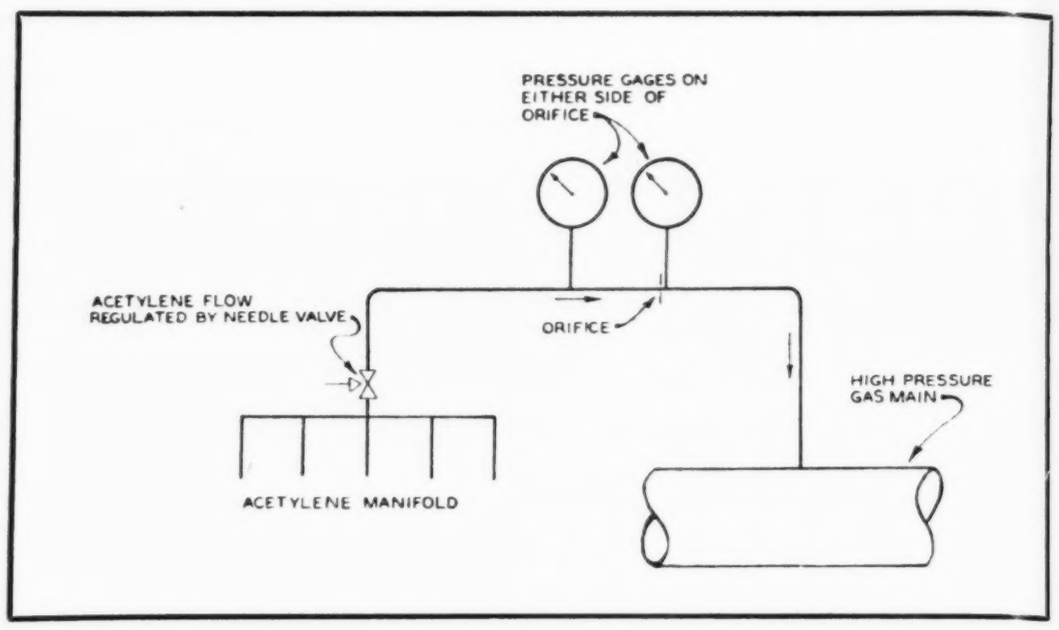
In trunk lines the rate and direction of gas flow are usually known and the chief problem is that of injecting sufficient acetylene into the main against the high pressure. The method developed for use under these conditions is illustrated in *Fig. 2.* A spider type of acetylene manifold is used which permits withdrawing from up to five acetylene tanks simultaneously giving a maximum acetylene flow of about 200 cu ft per hour. The acetylene flow is measured by the pressure differential developed across the orifice inserted in the tubing line. Since acetylene can decompose with explosive violence at high pressures the proper precautions must be observed in handling. To eliminate the possibility of the formation of the explosive copper acetylide aluminum tubing and brass fittings are used.

Detection Apparatus

A relatively simple portable apparatus was developed for detection of the presence of acetylene, shown in

Mr. Wilby, of Southern California Gas Co., Los Angeles, presented this paper at the PCGA Technical Service Group Conference April 28-29 in Los Angeles.




PRESSURE GAGES ON EITHER SIDE OF ORIFICE
ACETYLENE FLOW REGULATED BY NEEDLE VALVE
ORIFICE
HIGH PRESSURE GAS MAIN
ACETYLENE MANIFOLD

Injection . . .

Two methods for metering acetylene into gas distribution lines are shown. At left is apparatus developed for injecting it into low-pressure lines (Fig. 1); at right (Fig. 2) is apparatus for metering acetylene into high-pressure mains.

Fig. 3. It consists of an ordinary tire pump with the valve reversed so as to make it a suction pump. The gas sample is drawn first through a tube containing glass beads wet with concentrated potassium hydroxide solution, and then through a bubbler tube containing 0.1 normal silver nitrate solution. The potassium hydroxide is necessary to remove any carbon dioxide, hydrogen sulfide, and mercaptans from the gas sample as these compounds also react with silver nitrate. The presence of acetylene is indicated by the development of a white precipitate of silver acetylide. Acetylene is assumed to be absent if no precipitate develops after passing about 1 cu ft of gas sample through the bubbler.

We have employed acetylene for leakage detection in the field only in complex situations when the usual methods have failed, three field tests having been made to date.

First Test

The first field test was made on a two-mile section of pipe which had not been in use for a long period of time and pressure tests had indicated that excessive leakage existed. This gas line ran in close proximity to a large number of other pipe lines carrying gas, gasoline, and oil. An additional complication was that the gas line was a very old one and its exact location was not known. The combustible gas indicator showed a more or less constant concentration of gas throughout the area. For the pressure tests the line had been capped at either end. The acetylene was injected at one end but since there was no gas flowing in the line the acetylene could not distribute itself throughout the pipe. However, one leak was positively located by means of the acetylene test.

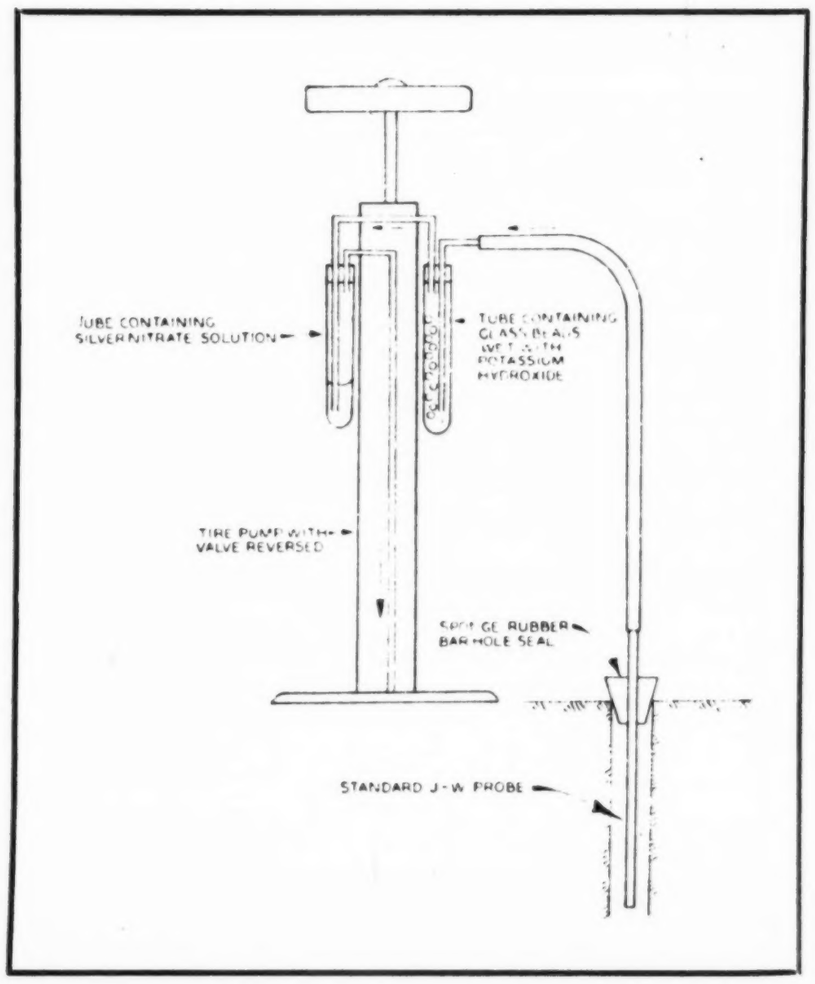
Succeeding Tests

In the second field test, gas had been found to be present under a group of buildings and a large contiguous paved area located in a known field gas area. Acetylene was injected into the distribution main that served the buildings. A positive test for acetylene was obtained from bar holes in the floor of the building. A leak was found to exist in the service line to the building.

The third test was made on a 1500-ft section of line which carried up to 10 MMcf of gas per day at about 120 psig. This line was in close proximity to about 20 other pipelines carrying gas, gasoline, and oil. In this instance one of the major problems was the injection of a sufficient quantity of acetylene into the line against the high line pressure and it was for this test that the setup illustrated in *Fig. 2* was developed. Tests were made with acetylene on two separate days and no evidence of leakage from the suspected line could be found. It was then presumed that this section of line had no significant leaks and that the gas found in the area was probably due to leakage from other lines in the vicinity.

. . . Detection

The portable device used to detect the presence of the tracer consists of a tire pump with valve reversed, which acts as a suction pump to draw gas through chemical solutions for analysis of components. Presence of acetylene is indicated if white precipitate forms in tube containing silver nitrate solution. Path of the gas is shown in Fig. 3 at right.

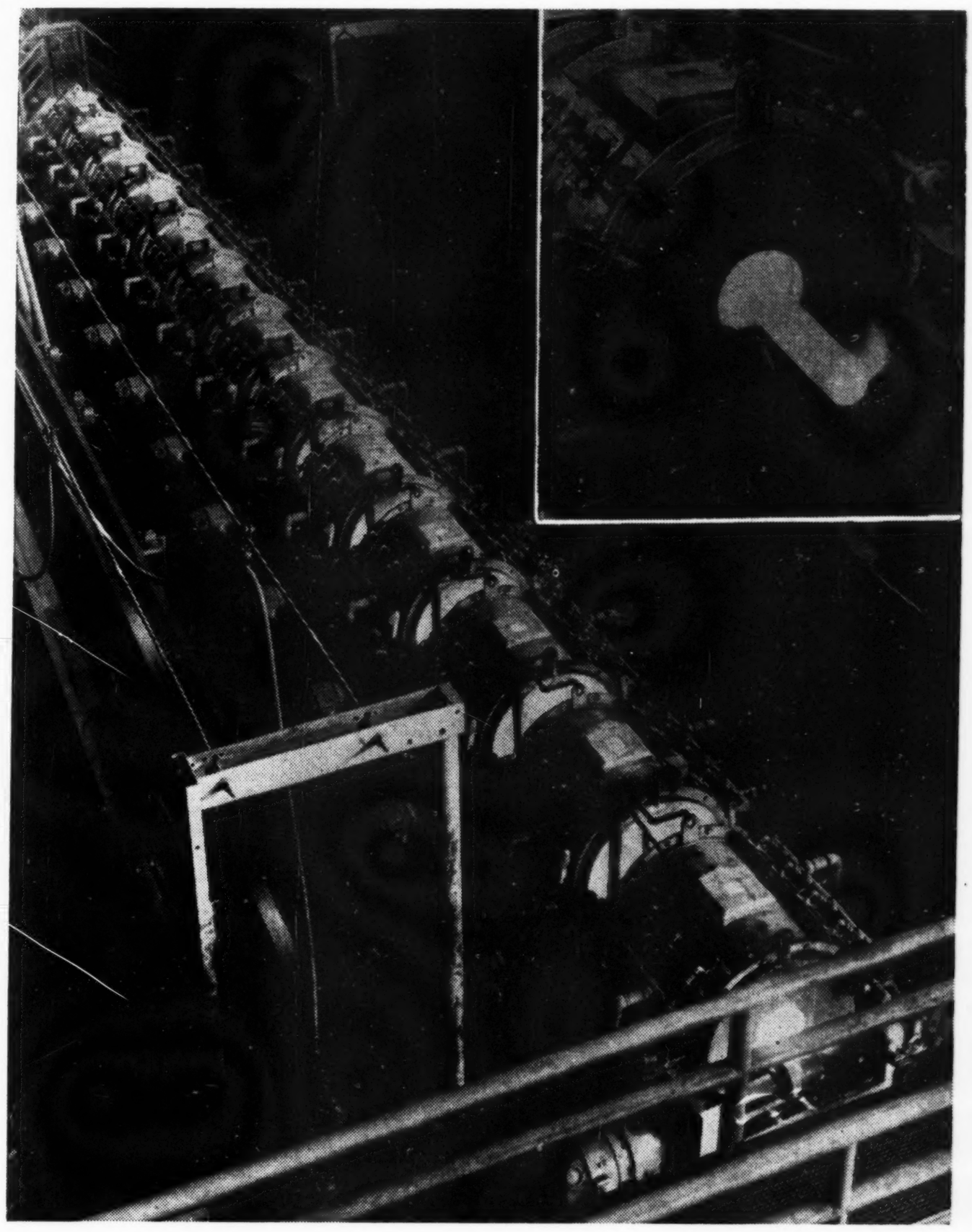

TUBE CONTAINING SILVER NITRATE SOLUTION
TUBE CONTAINING GLASS BEADS WET WITH POTASSIUM HYDROXIDE
TIRE PUMP WITH VALVE REVERSED
SPONGE RUBBER BAR HOLE SEAL
STANDARD J-W PROBE

Gas-Fired "Doughnut" Furnaces

THIRTEEN new doughnut-shaped furnaces have been installed in National Tube Co.'s Gary (Ind.) mill to heat pierced seamless steel tubes to high enough temperature so they can be rolled to specified size. Tube sections fly through the holes of the 13 doughnuts as fast as 240 ft a minute, emerging at the end, ready for rolling, at a lemon yellow temperature of 1800°.

This type of reheating furnace was selected by research engineers of United States Steel Corp.'s pipe-making subsidiary because it offers a maximum control of temperature, the 1800° objective being essential for good operation. Temperature control is exercised in two ways—by adjustment of the temperature of each succeeding furnace unit and by the speed or delay of transit of tube sections through the units.

Lined with heat-resistant refractory material and fed by gas premixed with air, the furnace units stand about a foot apart in six groups, their circular openings in a continuous row, like 13 doughnuts in a baker's box. The hole in each "doughnut" is approximately 1½ ft in diameter and 3½ ft thick. Roller conveyors between the furnaces bring up each tube separately, whisking it through the heating chamber to the next conveyor. (See illustration.)



Unfinished steel tubing passes through these 13 reheating furnaces. Tubes emerge ready for rolling, at 1800° F. Inset shows closeup of a "doughnut," with cylindrical electric eye which adjusts temperature automatically for each unit.

Heat Regulation

Twenty pyrometers, which measure temperature by radiation, regulate each furnace unit at its fuel supply, the pyrometer of each unit adjusting the temperature in the next to build up the required final temperature. At the same time a series of electric eyes regulates the speed of the tube's transit through the groups of furnaces by regulating the conveyor speed, providing a longer heating period when needed or shortening it if the tube is already very hot. Thus a tube that has cooled to a dull red after leaving the piercing mill before entering the doughnut furnaces can be carried at as low a speed as 15 ft a minute or, if its temperature is already in the cherry red, full red or orange color ranges, be sped through at more than 240 ft a minute. Since each tube section must be uniformly heated from end to end, tube length also becomes a factor in furnace control.

The furnaces are set up in this manner:

There are five groups of two furnaces each, with a sixth group of three furnaces at the discharge end of the line. The latter three are considered "soaking units." Each of the six groups is connected to a gas combustion controller of 60 Mcf per hour capacity. Each of the first five groups of two furnaces has automatic indicating-type temperature-limiting control instruments that maintain the desired temperature but prevent overheating. The three "soaking" furnaces are connected to a single instrument with the same limiting features.

A thermopile element ahead of each furnace, connected to an indicating and recording control instrument, records the temperature of a tube before it enters the furnace. The furnaces operate at maximum gas-burning capacity only when the temperature of the entering tube is below the set point of the instrument connected to that particular furnace.

Each of the heating furnaces is equipped with a total of 16 radiant burners. Each burner contains a tip in which there are a number of ports. Pre-mixed gas and air are discharged under pressure from these ports and directed so that each small flame sweeps the surface of the ceramic burner cup cavity, heating it to a degree of incandescence controlled by regulation of the fuel-air supply. Heat radiated to the tubes, plus that in the fully burned products of combustion, raises their temperature. All combustion takes place in the cup cavity and no flame impinges on the tubes.

Manifolds

All burners are completely manifolded with automatic fire checks at each burner group. The manifolds are

combined into a common connection to which are connected the automatic-temperature-control valves and air-gas mixture supply.

A safety blow-out relief unit is used with each of the combustion controllers. A raw-gas manual reset magnetic shut-off valve at the gas inlet of each gas-combustion controller automatically shuts off the gas in the event of gas-pressure failure, electric-power failure, or accidental flash-back. Each of these valves incorporates a pressure switch. A raw gas-pressure regulator on each of the gas combustion controllers reduces the 5-lb natural gas supply of the plant to a pressure suitable for the controllers. Each controller is equipped with an indicating-type flow meter.

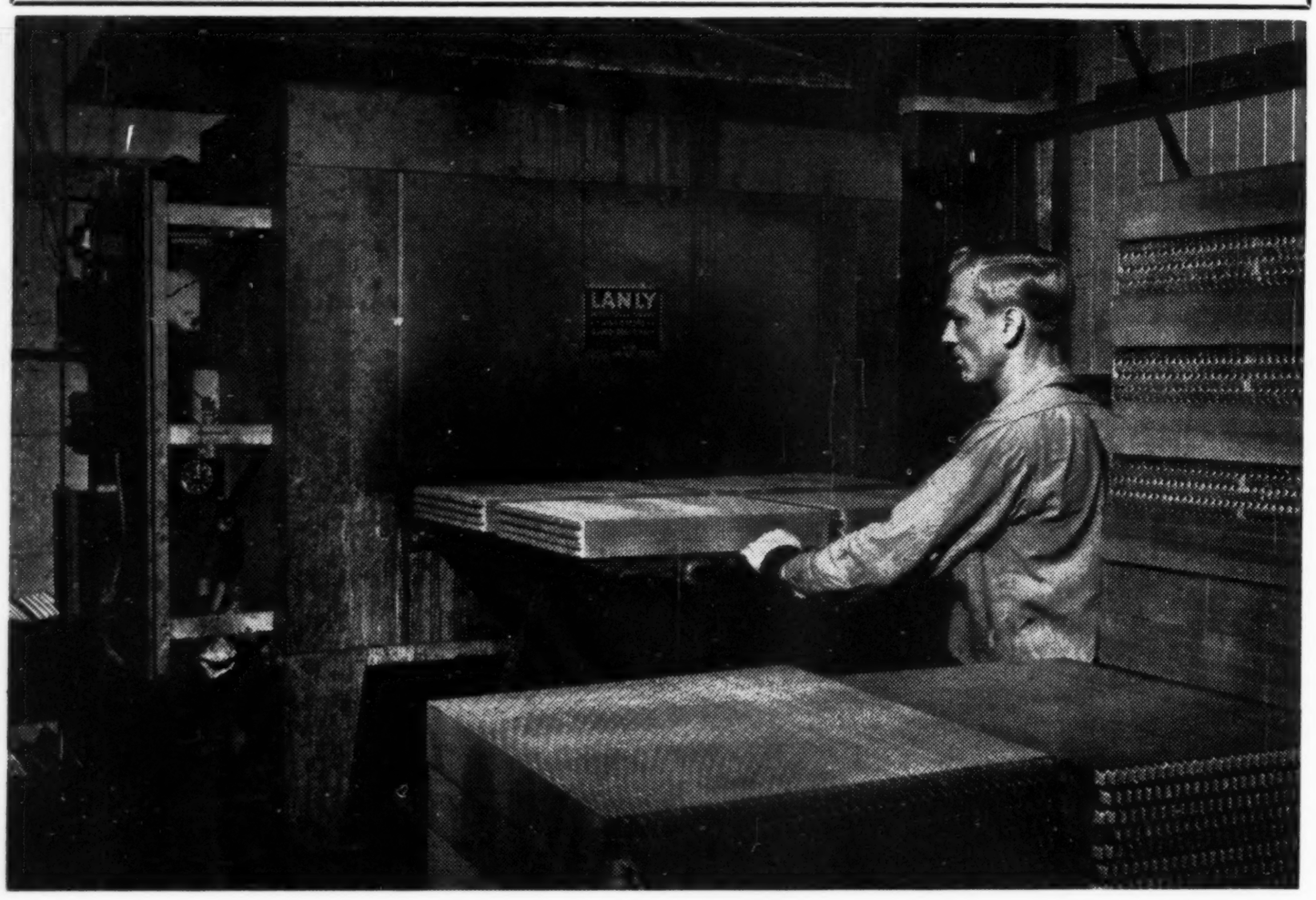
Either natural or coke-oven gas can be used as fuel. Use of coke-oven gas was made possible by special gas-cleaning units that eliminate dust particles that might clog burner ports.

Automatic temperature controls for each of the furnaces include an electronic-balance, circular-chart, recording and indicating control pyrometer that activates an air-operated fuel-air supply valve. An electronic-balance, strip-chart, indicating and recording potentiometer records final tube temperature.

The furnaces are constructed to accommodate tubes up to 45 ft long and 3 to 9 in. outside diameter. They are designed to heat for final sizing all types of alloy, stainless and carbon steel specialty tubing (both mechanical and pressure). This type of product finds wide use in the dairy and chemical industries, in aircraft of all kinds, in ball and roller bearing races, industrial conveyor rolls and petroleum still tubes.

The doughnut-type furnaces are used in conjunction with a huge rotary billet heating furnace and represent a major part of the modernization and rebuilding program recently completed at the Gary mill.

Solving Problems In Utillization



Gas-fired oven chosen for critical task of soldering brass tubes and copper fins in final assembly of radiator cores.

Radiator Core Soldering Oven

Problem: The Liberty Radiator Core Manufacturing Co. of San Francisco has been manufacturing and repairing radiator cores for over two decades. Recently extensive improvements were made in the plant and costly equipment installed for the manufacture of tubular radiator cores.

A new method in the manufacturing process was introduced, namely, the use of pretinned brass tubes which, when assembled with the copper fins in the final assembly, are completely soldered throughout in one operation by introduction in a gas-fired oven.

The problem in this case was the selection of an automatically controlled gas-fired oven to provide the critical temperature necessary to complete the operation. The annealing temperature of the copper fins is 650° F, and the temperature at which the solder flows is 580° F.

Equipment: A Lanly oven designed for a maximum temperature of 650° F, complete with automatic temperature controls, was chosen to do the work. The oven is 5 ft deep, 5 ft 9 in. wide, and stands 7 ft 4 in. high. It has a slot opening 6 in. high by 48 in. wide. The oven is constructed of 6-in. panels insulated with glass wool. Heat is furnished by a Lanly built-in direct gas-fired air heater equipped with one Eclipse box-type atmospheric burner having a capacity of 125,000 Btu of 1070-Btu natural gas. Push button control is provided.

A Wheelco Flametrol combustion safeguard is installed to provide flame failure protection with built-in time delay relay to allow time to purge the oven before ignition can take place.

A Dewey air flow switch cuts off the electric supply in case of blower failure.

A Partlow oven temperature controller controls the temperature within the oven and a Partlow high limit control governs the duct temperature.

Heated air is circulated and recirculated throughout the oven by an Industrial Gas Engineering Co. high temperature ball bearing fan. The heated air travels under the hearth, up through duct outlets, thence is taken off at top and recirculated. A stack is located on top of oven to provide exhaust.

Operation: Copper fins are stamped in one operation on a large punch press. The fins are then assembled with the pretinned tubes into cores of various sizes as required. The complete core assembly is then dipped into an acid bath prior to being placed in the oven.

The delicacy of the soldering operation requires a controlled temperature of 580° F.

The oven is equipped with a feeding rack which accommodates four cores at one time, each measuring 21 by 21 by 4½ in., and weighing a total of 120 lb. This is shown in the accompanying photograph. Other sizes can be grouped within the rack limits.

Results: This method of soldering results in quantity production, uniformity of product and a minimum of rejects.

The increase in efficiency and improvement over the former method of hand-dipping is readily apparent.

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Pacific Gas & Electric Co.
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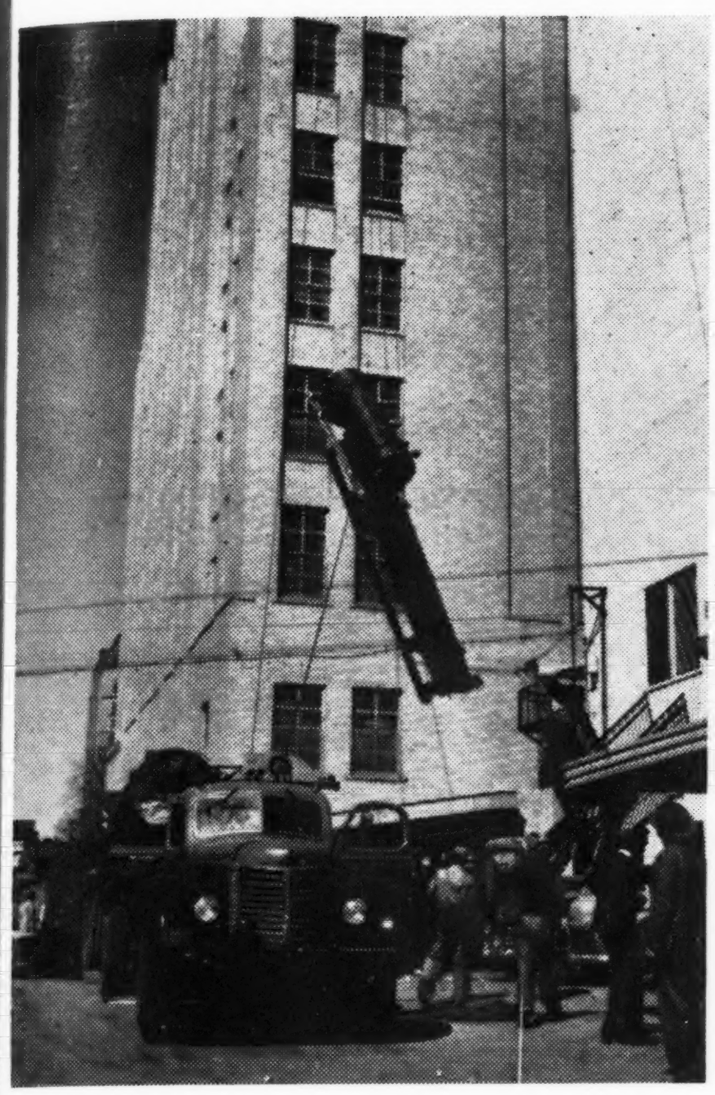

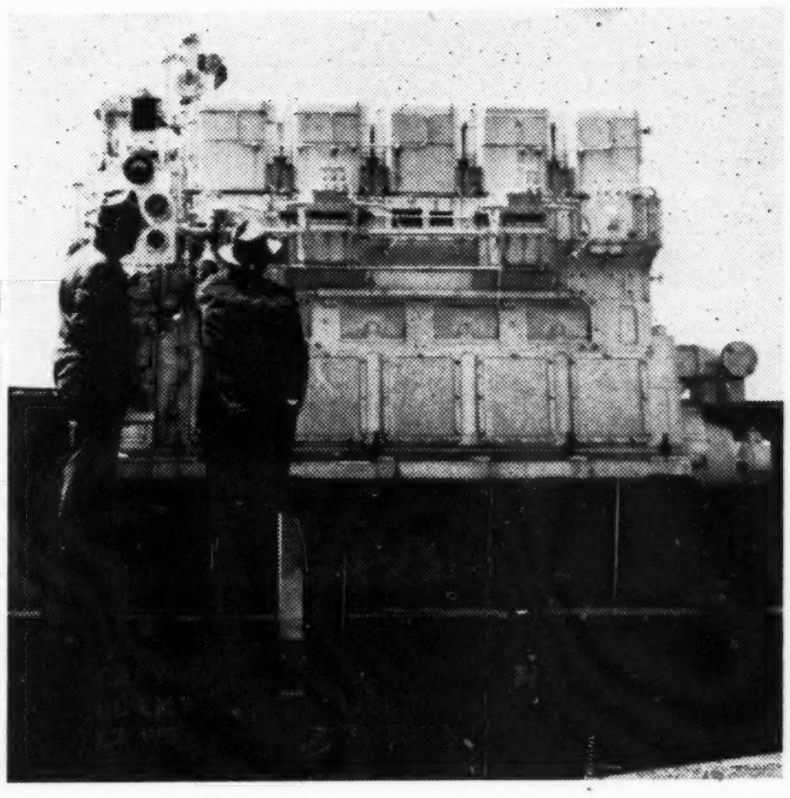

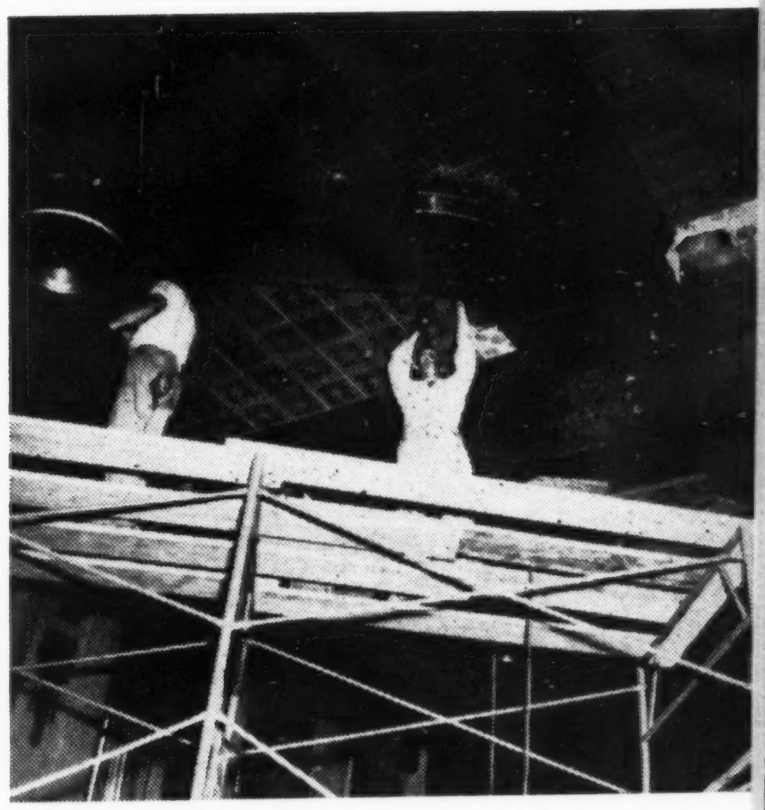

Up and up travels the 5700-lb absorption unit (left) as Lone Star's air conditioning installation begins. Its destination: headquarters 13th floor. Above, one of two 485-hp Cooper-Bessemer dual fuel engines, installed to aid in furnishing power for running air conditioning equipment, arrives by flat-car. At right, workmen install low-pressure system to augment auditorium's high-velocity window units for peak loads when large crowds are present. System utilizes ceiling units supplied either warm air or cool air through ceiling duct work and interior risers from basement plant.

LONE STAR stabilizes its weather with gas

A $500,000 year 'round air conditioning installation for Lone Star Gas Co.'s two headquarters buildings in Dallas will be completed late this summer. The system, which provides summer cooling and winter heating for both buildings, one a 10-story and one a 13-story structure, is a Carrier absorption type employing steam for air conditioning purposes.

Exclusive

Refrigeration will be provided from a central plant on the 13th floor of the larger building, where four 135-ton absorption units are located. These units provide chilled water for cooling during the summer months and utilize steam from the boiler plants in the basements of the two buildings. Refrigeration machinery operating on the absorption principle was selected by Lone Star because it utilizes natural gas as a source of energy and the company is particularly interested in promoting this type of refrigeration system.

Flash Evaporation

The machines handle the cooling load through flash evaporation of sprayed water, induced by a highly absorptive brine solution. A continuous cycle enables repeated use of the solution without loss of salt, by boiling the water with steam and pumping the salt back into the absorber chamber. The units operate on either high or low pressure steam or with low pressure waste steam.

Office temperatures will be controlled by individual window units through which chilled air will be delivered in summer, heated air in winter. The conditioned air is delivered from the basement plants through ducts, but additional booster coils are provided in each window unit for increased cold or increased warmth as might be desired in the individual offices. The booster units, served through copper piping from the central plant, handle a direct steam or chilled water load in contrast to the ducts which convey only warm or chilled air.

Heat Exchanger

Year 'round use of the installation will be possible with a steam-to-water heat exchanger, which is being installed for the winter months. Thus warm water will be supplied through the window unit coils in all offices. Most tubing for the system is copper and the old steam radiation system has been completely removed.

Gas engine driven generators which provide electricity for the buildings will also furnish power for motors running the air conditioning equipment. Two additional 485-hp Cooper Bessemer dual-fuel gas engines and two 320-kw generators are also being installed. No additional boilers are needed since the system will utilize boilers previously used for heating.

Conventional low-pressure air conditioning will be used only on the first floors of both buildings, part of the basement, and in the 11th floor auditorium of one building. The auditorium will be served with the conventional high velocity window units for normal light loads, supplemented by a low pressure system utilizing ceiling units supplied through interior rises directly from the basement.

Engineering Problems

Basic architecture of the two Lone Star office buildings differs considerably and thus presented engineering problems in designing a single installation to serve both buildings. One building reduces in floor area as it rises upward while the second unit is of equal size throughout its entire 10-story area. In this latter building it was possible to install a down feeding of air from a dehumidifying unit on the building roof. In the second building, the dehumidifier is in the basement and air is circulated upward through vertical ducts.

Outside offices in both buildings will be served by the conduit system using high velocity air risers and individual window units. Inside offices will be served by the ceiling blender units, allowing use of the high velocity system with vertical ducts.

Zumwalt and Vinther, Dallas consulting engineers, designed the installation.

Corrosion in Water Heaters

Findings of British tests on action of flue gases upon heat exchangers reported

(Condensed by Cyril Tasker, director of research, American Society of Heating and Ventilating Engineers, from a paper published in the April issue of the Journal of the Institute of Fuel, London.)

IN the April 1949 issue of the Journal of the Institute of Fuel (London), R. Kerr and S. M. Withers gave interesting results from a study of the corrosion by flue gases of copper heat exchangers of the type used in instantaneous water heaters. Corrosion-resistant alloys are, they say, successfully used for the heat exchangers in storage heaters, but their low conductivity and high cost make them unsuitable for use in the instantaneous type of heater. The exchangers in such heaters are generally made of copper, dipped in a solder bath containing 80% lead and 20% tin.

Fundamental studies have shown that the bulk of the corrosion on water heaters is due to the presence of sulphur trioxide in the flue gases. The corrosion takes place after a film of dilute acid formed from the sulphur trioxide and water vapor has been deposited on the metal surface. One type of corrosive condition exists when the heater is warming up or cooling down and another when the heater has reached its working temperature.

In practice, when a steady state has been reached, there may be several corrosive conditions existing simultaneously. Some parts of the heat exchanger will be operating at temperatures above the "acid" dew-point. (This is the dew-point of the flue gases when sulphur trioxide is present. The dew-point as usually understood is here called the "acid-free" dew-point.) Other parts of the heater, i.e., those near the water-tubes, will never attain temperatures above the "acid" dew-point. Furthermore, during the heating-up period all points of the heat exchanger will pass through the temperature range in which condensation occurs. From the point of view of heat-exchanger design, it is important, these investigators point out, to know the influence of temperature at any point in the exchanger on the rate and mechanism of corrosion.

The paper gives details of an experimental investigation of the effect of temperature on the corrosion of tin-lead coating on de-oxidized copper tubes of about 1-in. internal diameter. The tubes were coated by immersion in a molten tin-lead alloy bath for 30 seconds at 330°C (626°F), the coating thickness being of the order of 0.002 cm (about .001 in.).

The results clearly indicated that corrosion was at a maximum when the copper tubes were at temperatures near either the "acid-free" dew-point or the "acid" dew-point of the flue gases. Corrosion diminished rapidly when the tubes were exposed to temperatures above or below these dew-points. Generally speaking, in the tests here described, the "acid" dew-point was about 40°F above the "acid-free" dew-point, i.e., between an average of 102°F and an average of 142°F.

The conclusions which these investigators draw from these tests are as follows:

1. Under conditions where the temperature of the metal does not rise appreciably above the "acid-free" dew-point, corrosion is most rapid at the dew-point itself, and falls off rapidly above, and more slowly below, the dew-point. At the maximum corrosion rate a coating 0.001 in. thick would have a minimum life of 3 years under normal conditions of use.
2. For conditions where the temperature of the metal rises well above the "acid-free" dew-point, but less than 20° C above the "acid" dew point, corrosion again is most rapid near the dew-point, and decreases fairly rapidly on either side, the rate of corrosion depending on the amount by which the temperature is below or above the dew-point. At the maximum corrosion rate a coating 0.001 in. thick would have a life of 3½ years.
3. At temperatures more than 20° C above the "acid" dew-point, corrosion is negligible. (This is in disagreement with the view commonly held that corrosion would be negligible if condensation could be prevented. This will only be the case if the temperature is 20° C in excess of the "acid" dew-point.)
4. Calculations suggest that the corrosion due to the acid which is initially condensed is potentially more dangerous when the metal is subsequently heated above the "acid" dew-point than the corrosion caused by steady running below or at the dew-point. Investigations are being carried out to ascertain whether this is in fact the case.

Research on Radiant Gas Burners

A study of their characteristics to determine capacity, efficiency, and required pressures

By J. D. KELLER
Associated Engineers
Pittsburgh, Pa.

(Condensed from paper presented at AGA Sales Conference on Industrial and Commercial Gas, Nashville, Tenn., April 5-7.)

Although radiant gas burners were developed at least as early as 1912, and have since attained wide use for domestic space heating and more recently for industrial heating, especially for drying, very little definite information has been published concerning their characteristics. In particular, figures obtained from actual tests of the radiating efficiency and the capacity have been almost unobtainable. It is thought, therefore, that the data here presented, and obtained during an extensive research project in which many radiant burners of various types were tested, may be of value.

The objects of the research were: first, to test the various types of industrial radiant burners then available on the market, and to determine definitely their capacity, radiating efficiency, required gas or mixture pressure, and operating characteristics; second, to develop, if possible, radiant burners of higher specific capacity having greatly increased radiating efficiency, together with satisfactory length of life; the burners preferably to be capable of operating with an inspirator and in-

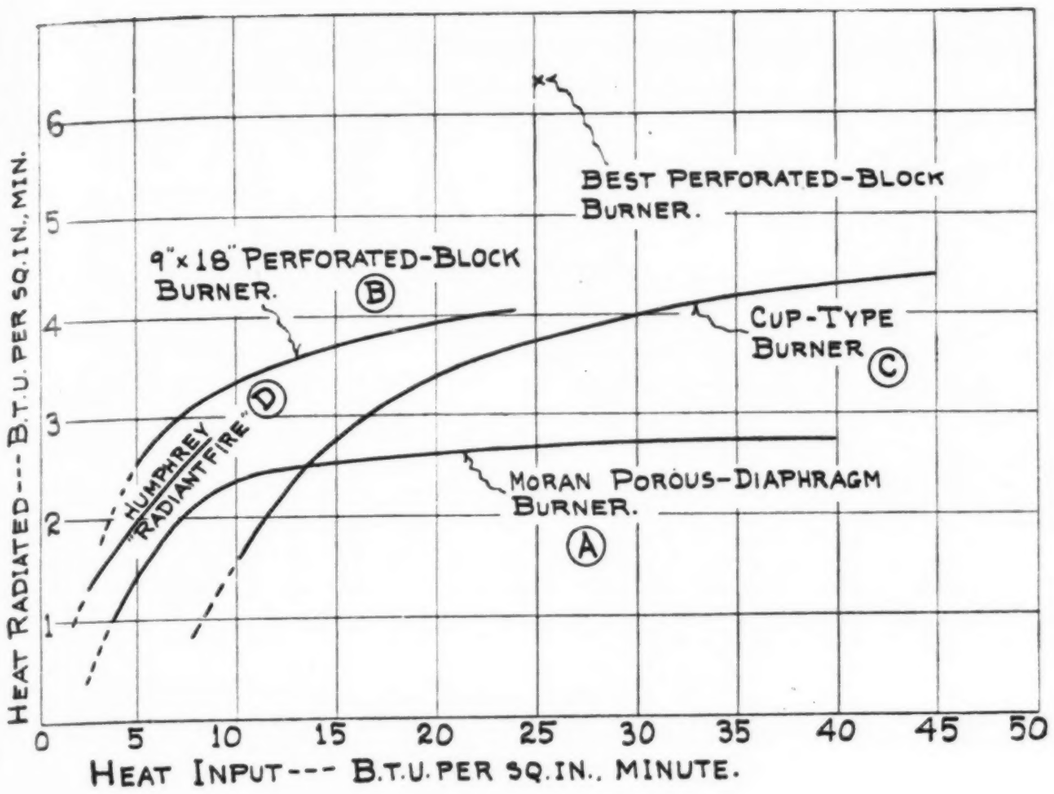

Fig. 1

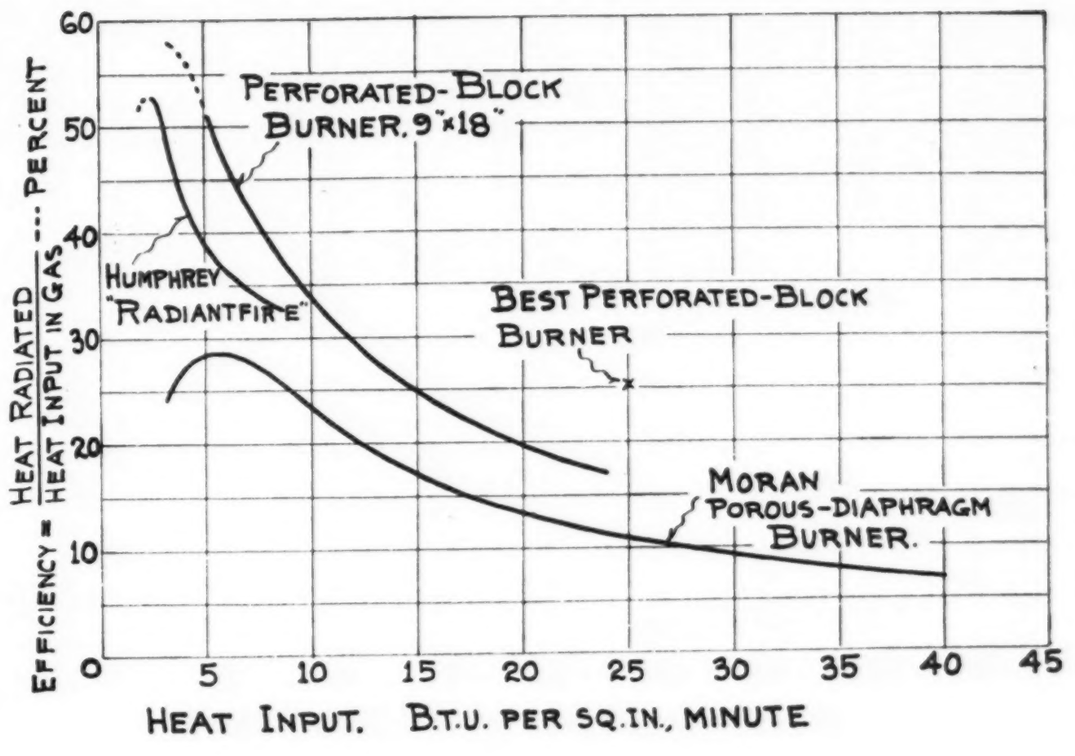

Fig. 2

ducing the required combustion air from the atmosphere, without requiring a fan or blower.

The tests were made in the Combustion Laboratory at Carnegie Institute of Technology under the general supervision of Prof. W. Trinks, at that time head of the department of mechanical engineering, and they covered the period from February, 1940, to March, 1942; the greater part of this time was consumed by the refractories manufacturers in producing the various burner blocks tested. The work was sponsored by the Wean Engineering Co. of Warren, Ohio, and the results are now made available for publication by the courtesy and with the encouragement of that firm.

Burners Tested

The commercial burners tested were:

1. The Moran burner, made by Radiant Combustion Inc. of Canton, Ohio. This was a burner of the porous diaphragm type.

2. The Selas cup-type burner, the best-known of all industrial radiant gas burners.

3. The Humphrey "Radiantfire," a type used chiefly for household space heating but applicable also to certain industrial heating operations.

As to the attempt to produce improved radiant burners, a preliminary survey led to the decision to follow simultaneously two distinct lines of development:

a. That of the porous-diaphragm radiant burner, similar to the Bone (an English development) or the Moran type, and

b. That of perforated burner blocks, in which the combustion would occur within numerous open-end cavities in the refractory block, similar to the type described in the literature as used in Germany before the war, and called "steinstrahlbrenner."

In all, 43 porous-diaphragm burners and 18 perforated-block burners were tested. All of the burners tested showed the same general form of characteristic curves of radiation, as illustrated in *Figs. 1* and *2*. In both of these illustrations, the abscissae represent specific input of heat in Btu per minute, square inch of active area of the burner face, (the area of the non-active rim not being included), corresponding to the product (cu ft of fuel gas per hour $\times$ gross calorific value, Btu/cu ft) divided by 60 times total radiating area of burner face, square inches. The ordinate in *Fig. 2* represents the specific radiation rate in Btu per minute for each sq in. of radiating area; it therefore corresponds to output in the form of radiated heat.

As the gas flow is increased from a low value, the radiation intensity at first rises rapidly, then less rapidly, and at high gas-input rates it tends to level off; in the case of one burner, it actually decreased slightly at the highest input rate tested. In all radiation burners, the turn-down of heat output is far from directly proportional to the turn-down of gas, but from the operating standpoint a burner having a characteristic like *D* or *B* in *Fig. 1* is preferable to one having a curve like *A*, in which over a considerable range the gas flow can be increased without effecting any appreciable increase in the amount of heat radiated.

From *Fig. 1* are derived the radiation-efficiency curves shown in *Fig. 2*, the ordinate in the latter illustration being the quotient of (ordinate in *Fig. 1* $\div$ abscissa in *Fig. 1)* since

$$\text{Efficiency} = \frac{\text{Output of heat in the form of radiation}}{\text{Input of heat as gross calorific value of fuel}}$$

It will be noticed that all of the efficiency curves follow the same general form; that is to say, each has a peak of maximum efficiency at some particular rate of gas flow and heat input, with the efficiency falling off with greater or less rapidity on either side of this peak point in the characteristic curve. Its maximum value may be higher or lower, and the peak may occur at a larger or smaller specific rate of heat input, in different radiant burners, and these values are important for correct application of each type of burner, but the shape of the curve is the same for all.

Explanation of Curves

The reason why the curves have this peaked form is by no means self-evident; that the efficiency should decrease, at least to some extent, at the higher input rates was anticipated, but that it should also decrease at low input rates was hardly to be expected. The explanation appears to be that, as the burners are turned down to lower and lower gas flow rates, the temperature of the refractory decreases, until it becomes lower than that at which the refractory surface can act as catalyst for the combustion. Below this, combustion does not occur on the surfaces, the rate of heat transfer from gas to solid becomes negligibly small, and the radiation drops almost to zero at the low rates.

In that burner (designated No. 11) which gave the highest radiation—slightly more than 25% of the total heat in the gas, at "normal maximum" gas flow rate—the projected area of the holes was 51% of the total area of the blocks including the dead area of the refractory rim, or 60% of the active area in the middle of the burner. This was with a minimum thickness of the walls between the combustion holes of approximately $\frac{1}{8}$ in., the centers of the holes being at apices of equilateral triangles. The inactive rim, in per cent of the active area, could be reduced only

THE *One* GAS RANGE

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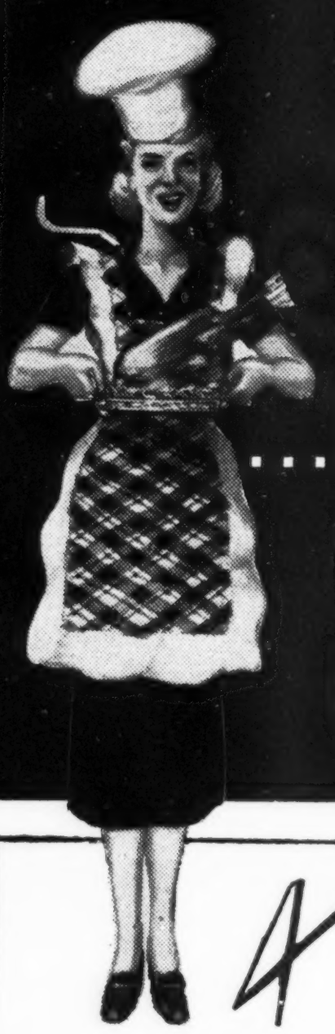
A Housewives



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...IT OFFERS THEM THE MOST

- **LARGEST OVEN** 17x20 in. in the clear!
- **LARGEST BROILER** 17x20 in. in the clear!
- **MOST BURNER SPACE** Full 10½ in. on centers!
- **EASIEST TO INSTALL** Service connection in front!
- **EASY TO KEEP CLEAN** All enamel, rounded corners!
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THE *One* GAS RANGE TO HANDLE FOR BIGGER SALES . . . PROFITS

There is no other Gas Range on the market so advanced in engineering and design that offers the Housewife so MUCH MORE for less . . . desirable features to improve cooking and meal preparation. In performance it's tops, in acceptance it's the leader . . . by comparison it's outstanding. Point for point it's 'way ahead . . . and will advance you to the forefront in sales.

SEE YOUR EMPIRE REPRESENTATIVE OR WRITE US DIRECT

EMPIRE STOVE COMPANY

BELLEVILLE, ILLINOIS

MANUFACTURERS OF GAS HEATING AND COOKING APPLIANCES

by increasing the size of the burner face.

So little heat is conducted from the sides of the combustion holes, in a direction generally perpendicular to the burner face, to the solid part of the burner face between the holes, that the radiation from the surface area between the holes is negligible. It may, however, be possible to decrease the wall thickness between the holes, and thus increase the ratio of active radiating area to total face area. In order to estimate the maximum possible efficiency of radiation attainable, this may be assumed to be carried to the extreme, with the holes of hexagonal shape and the walls made paper-thin.

In that case, with the same proportion of dead rim area, the active radiating area would be increased about 50% over Burner No. 11; and, at the normal maximum gas rate of 1.26 cfh of natural gas burned per sq in. of total burner face area, the radiating efficiency would be increased to 34% of the total heat in the gas. This would be the ideal maximum; actually the walls between the holes must have an appreciable thickness, hence it seems doubtful that the efficiency can ever exceed 30% at the normal gas rate, with a peak of 53% at some lower gas rate, in a burner having the walls between the combustion holes of sufficient thickness for practicability of manufacture and not too great fragility.

Further increase of efficiency could be attained only by the discovery of some means of greatly increasing the heat transfer from the flame to the refractory, or of some substance having phenomenally greater catalytic power for speeding up combustion on the refractory surfaces; or by some radical change in design not at present foreseeable.

Cracking

Observations seemed to indicate that slight "cracking" of the natural gas occurred in all of the porous-diaphragm burners and in some of the perforated-block burners. This was thought to be decidedly improbable, in view of the fact that the gas and air were (in most cases) very thoroughly mixed, and that the ideal quantity of air or a slight excess of air was present before the mixture entered the burner. According to combustion theory, the air or oxygen should have reacted with the gas by hydroxylation rather than by cracking.

However, slight luminosity of the flame was visible in nearly all cases, even with excess air up to 5%. At first it was thought that this luminosity might be caused by traces of sodium compounds in the refractory, but that would not explain the actual slight smokiness observed at the tail of the flames, and the presence in some cases of a smoky odor. It was then thought that some unexplained error might exist in either the air or the gas measurements, so that there might actually be present an excess of gas rather than a slight excess of air. Orsat analyses were therefore made, in some of the tests, of the gases issuing from the burners, but the results checked the gas flow measurements, showing a slight excess of air.

The formation of small pellets, apparently of carbon, in some of the void spaces of one of the porous block specimens which was broken apart, has already been mentioned. In the porous burners, a possible explanation might be a filtering or separating effect, if the pores of the refractory were sufficiently small to retard the heavier molecules of the higher hydrocarbons in the natural gas (especially if traces of hydrocarbons much higher in the series than shown by the fuel analysis were present, or polymerized molecules, or the "oil fog" sometimes introduced into natural gas transmission lines) to a greater extent than the oxygen and nitrogen molecules of the air. But this could not explain the slight smokiness of the flames from some of the perforated-block burners.

Chemical Explanation

The more probable explanation is a chemical one. In researches to determine the causes of deterioration of refractories because of exposure to various furnace atmospheres, it has been shown that the iron compounds present in the refractory material act as catalysts to induce the cracking of carbon monoxide at temperatures around 900° F, forming CO_2 and carbon; the latter deposits in the pores of the refractory.

It is known that a similar action can occur in the case of natural gas, even when a certain amount of air is mixed with the gas, although no definite information is available as to the maximum ratio of air to gas at which the cracking can occur. Judging from the observations in the present series of tests, even an air admixture corresponding to the ideal air-to-gas ratio is insufficient to prevent it entirely.

Heater Installation in Tight Places

Performance data compiled for guidance in engineering jobs in confined quarters

By **WALTER B. KIRK**

Chief Research Engineer
AGA Testing Laboratories

(Condensed from a paper presented at the Pacific Coast Domestic Research & Utilization Conference, May 25-27 Los Angeles.)

A nation-wide trend toward the building of small, tightly constructed homes without basements has given the entire gas industry a unique challenge: that of providing such homes with almost invisible central heating plants. The inherent advantages of gas as a fuel have led many architects and builders to believe that compactly designed central gas space heating equipment can be more easily hidden than competitive fuel burning equipment in a small closet or utility room located almost anywhere in a home or business office. While this thinking is essentially correct, a certain amount of fundamental knowledge and engineering application is necessary to make such an installation a successful one.

Because of the rapid growth in the number of such installations and because of a general need for basic data on performance of furnaces and boilers in small spaces which could be used as a guide by architects, engineers, and builders, the committee on domestic gas research of the American Gas Assn. sponsored a research project on this subject as a PAR Plan activity.

Recommendations resulting from our tests were supplemented in *Research Bulletin 53* by means of a schematic drawing so that the essentials of a confined space installation could be seen at a glance and readily understood. *(Fig. 1.)*

While these recommendations seem to provide a safe and fairly satisfactory method for installing equipment in confined spaces, we have already encountered some questions regarding the possibility for altering them or for clarifying further details of installation. For example, in an extremely cold climate inlet and outlet air openings to the outside of 1 sq in. for each 1000 Btu per hour of input rating might be excessive. In fact, the possibility of a boiler or its cold water return line freezing during an off cycle presents a problem. In other words, gas company engineers in

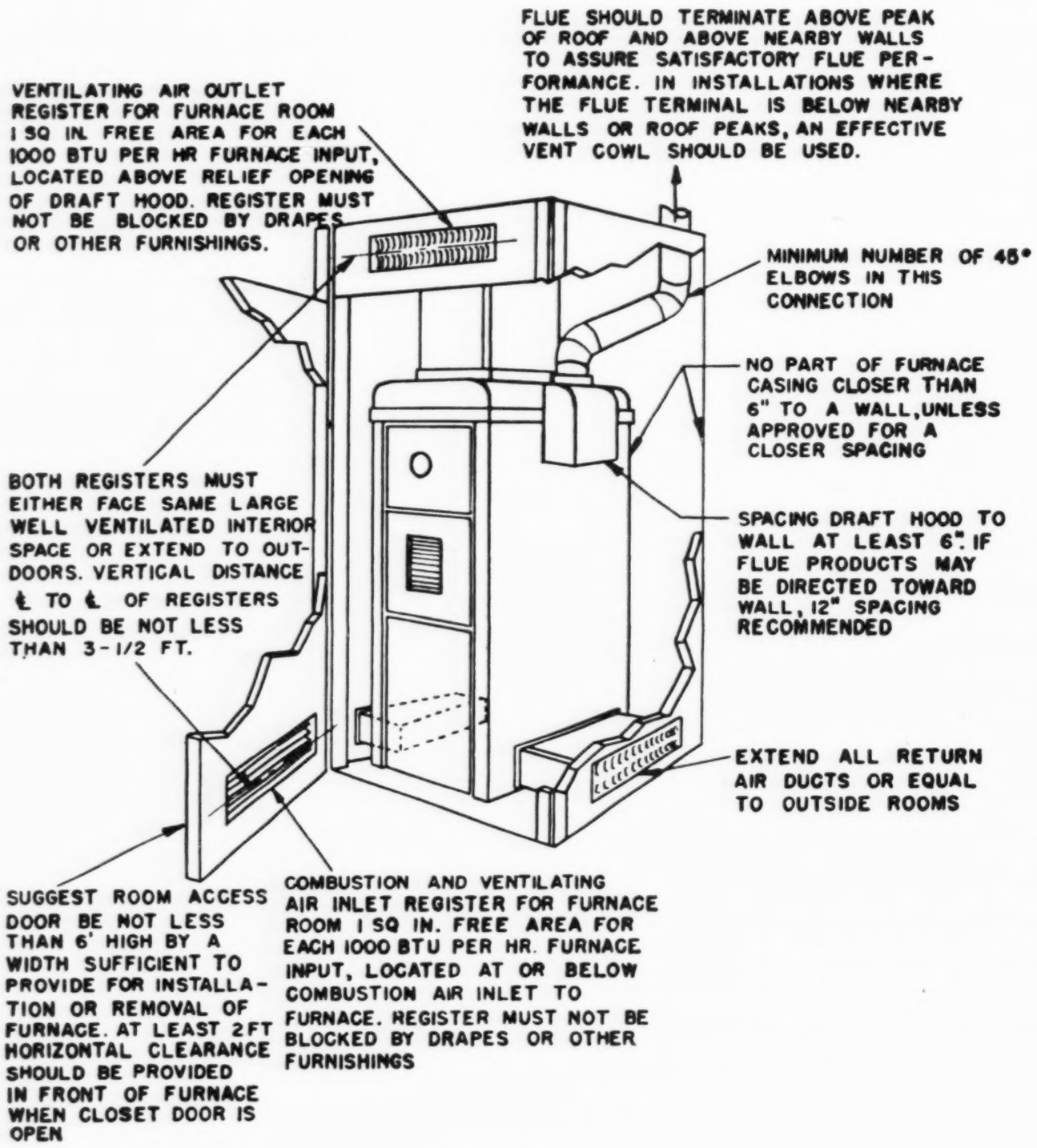

FLUE SHOULD TERMINATE ABOVE PEAK OF ROOF AND ABOVE NEARBY WALLS TO ASSURE SATISFACTORY FLUE PERFORMANCE. IN INSTALLATIONS WHERE THE FLUE TERMINAL IS BELOW NEARBY WALLS OR ROOF PEAKS, AN EFFECTIVE VENT COWL SHOULD BE USED.
VENTILATING AIR OUTLET REGISTER FOR FURNACE ROOM 1 SQ IN. FREE AREA FOR EACH 1000 BTU PER HR FURNACE INPUT, LOCATED ABOVE RELIEF OPENING OF DRAFT HOOD. REGISTER MUST NOT BE BLOCKED BY DRAPES OR OTHER FURNISHINGS.
MINIMUM NUMBER OF 45° ELBOWS IN THIS CONNECTION
NO PART OF FURNACE CASING CLOSER THAN 6" TO A WALL, UNLESS APPROVED FOR A CLOSER SPACING
BOTH REGISTERS MUST EITHER FACE SAME LARGE WELL VENTILATED INTERIOR SPACE OR EXTEND TO OUTDOORS. VERTICAL DISTANCE ℄ TO ℄ OF REGISTERS SHOULD BE NOT LESS THAN 3-1/2 FT.
SPACING DRAFT HOOD TO WALL AT LEAST 6". IF FLUE PRODUCTS MAY BE DIRECTED TOWARD WALL, 12" SPACING RECOMMENDED
EXTEND ALL RETURN AIR DUCTS OR EQUAL TO OUTSIDE ROOMS
SUGGEST ROOM ACCESS DOOR BE NOT LESS THAN 6' HIGH BY A WIDTH SUFFICIENT TO PROVIDE FOR INSTALLATION OR REMOVAL OF FURNACE. AT LEAST 2 FT HORIZONTAL CLEARANCE SHOULD BE PROVIDED IN FRONT OF FURNACE WHEN CLOSET DOOR IS OPEN
COMBUSTION AND VENTILATING AIR INLET REGISTER FOR FURNACE ROOM 1 SQ IN. FREE AREA FOR EACH 1000 BTU PER HR. FURNACE INPUT, LOCATED AT OR BELOW COMBUSTION AIR INLET TO FURNACE. REGISTER MUST NOT BE BLOCKED BY DRAPES OR OTHER FURNISHINGS

Fig. 1

the northern states question the necessity or advisability of having such large openings to the outside.

Human Habit

The human tendency to utilize confining spaces for storage purposes is also a difficult problem. It is so easy to store linen, mops, brooms, wash pails or other domestic equipment in such spaces that some thought might be given to reducing furnace clearance to an absolute minimum. Perhaps flush to wall installations should be considered with adequate provision of access doors for the serviceman. Such installations would necessitate, of course, proper insulation and fire proofing of the chamber walls. Another possibility is to provide spacers or partition extensions on the front of the furnace so as to prevent access to the clearance spaces around the sides or rear of the furnace.

What Customers Want in Ranges

Six suggestions for pleasing the housewife and satisfying the dealer

By H. VINTON POTTER

AGA Coordinator of Promotion

(Condensed from paper presented before AGA Domestic Research and Utilization Conference, Cleveland, March 31-April 1.)

Two important jobs face us. First of all, we must improve the *design* of our equipment, and second we must pay attention to service features which are important not only to the customer but to the seller as well. Some of you may question this order of importance, but women who are responsible for the selection of most of the equipment we sell compare our products with those of our competitors on the basis of pleasing appearance. They assume that the construction features have been taken care of. No matter how well our appliance is designed or how serviceable it may be, and no matter how warmly it is endorsed by the head of the service department, if customers won't buy it because its appearance is against it, then the service department will be of little use.

I would like to offer the following six general suggestions:

Recommendation

1. *Improve the appearance of present appliances.*

2. *We need new appliances, and face-lifting of the old, but not "over-gadgeting."*

3. *We need more flexibility and interchangeability.* What happened to flexible connections and gas convenience outlets? Why can't we achieve the same standardization in door springs, of which there are some 40 different kinds serving only one purpose?

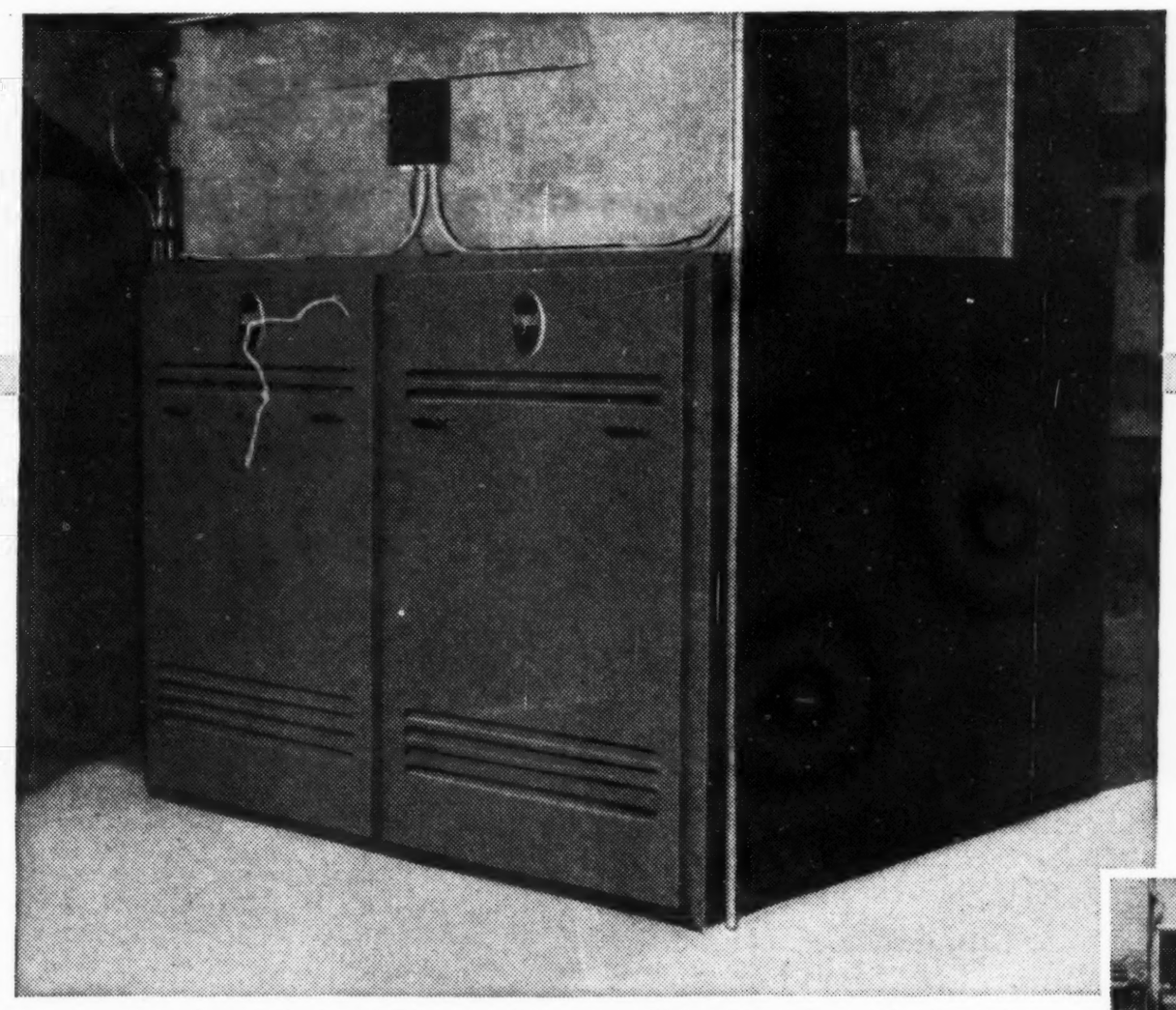
4. *We should take advantage of AGA research and then do a lot more of our own.* The large electrical manufacturers spend tremendous sums in researching for their own appliances. What they do individually, we try to do in basic matters through AGA, thereby serving you who may not be able to undertake some of the projects which will be of common benefit and which we can accomplish better. But when these things are proven, do you use them to best advantage and immediately incorporate them into your next line? One utility executive suggested that we limit our research to a fewer number of projects, predicating such limitations on a much greater acceptance by the manufacturers who are the beneficiaries of this expensive research.

5. *There can be more standardization of dimensions.* Even though we could not accept the modular planning sponsored by some trade associations, we at least could make our appliances in units of even inches. When designing equipment, we should consider the dimensions of the cabinets against which they will be placed. We should consider depth and height and the toe-cove space, and then try to relate our equipment to the lineup of units which they will grace.

6. *We should stress the importance of the AGA Seal.* The AGA Seal can, if properly plugged by those who are privileged to use it, become the one overall endorsement which will commend such appliances as bear them to the prospective purchaser. Personally, I wish that only 50% of all domestic appliances could conform to the standards because the standards would be that much higher than they are now. I think we can do much to revise these standards so that only the best appliances can meet them.

"BRYANT Winter Air Conditioning provides *Customer Comfort* AT LOW COST"

says A. Wilner,
Owner-Operator,
Western Auto
Associate Store,
Somerville, N. J.



"Bryant Winter Air Conditioning does a very highly satisfactory job in our store . . . warms, filters, humidifies and circulates the air to provide comfort for customers and employees alike. We are happy to recommend Bryant Automatic Heating."

Bryant Model BA-88 Winter Air Conditioning installation in Western Auto Associate Store delivers warm air to the store through overhead supply outlets. Return air is removed from the store at several points along the floor line. Heating contractors: Elling Bros., Somerville, N. J.

You can get a *full* share of the warm-air heating business in your area with the Bryant Model BA-88 Gas-Fired Winter Air Conditioner. The BA-88 has a place in the forced warm-air systems of all types of homes and helps create ideal indoor weather in offices, stores and other commercial applications.

These Bryant-engineered features set the BA-88 apart from ordinary warm-air equipment: All cast iron tubular heat exchanger for years and years of superior service and high operating efficiency; rugged cast iron burners with raised, *precision-drilled* ports (specifically drilled for the type of gas to be burned, whether it be natural, manufactured, LP or mixed gas); and the famous Bryant Diaphragm Valve and Automatic Pilot.

The Bryant Model BA-88 Winter Air Conditioner is fully enclosed in its sturdy steel jacket, requires a minimum of floor space for equipment of its type. It is made in seven standard sizes, with inputs from 60,000 to 250,000 Btu per hour.

Let the pup be furnace man
. . . and water boy, too!

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BRYANT HEATER DIVISION
Affiliated Gas Equipment, Inc.
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THE MOST COMPLETE LINE OF GAS HEATING EQUIPMENT IN THE NATION

SEEN AT THE FAIR

New Devices to Widen Use Of Gas Make Debut in Britain

GREAT Britain's gas industry, which has been speeding up production for the nation's export drive, sponsored an impressive exhibit at the recent British Industries Fair. The display, arranged by the British Gas Council and located in the gas section at Castle Bromwich, Birmingham, included actual demonstrations of important industrial processes, as well as typical gas appliances available for varied uses in the industry—several of them on view for the first time. "Gas speeds production" was the council's theme.

The City of Birmingham Gas Dept., in conjunction with a leading firm of tube makers, showed in its display the type of experimental work which is being carried out by the industry to meet the requirements of manufacturers. In certain circumstances, manufacturers find it advantageous to heat bars, tubes or strips in the production line, thereby avoiding the necessity of batch loading into large furnaces. The method enables the tubes to be heated while in motion, by employing a very small gas-fired furnace which is capable of temperatures in excess of the 1500°C at which it operated during the demonstration.

The temperature to which tubes are heated is lower than the wall temperature of the furnace, and it is varied according to the type of tube by adjusting the speed at which tubes are conveyed through the hot zone. The furnace is fitted with an automatic control for mixing the gas and air, using gas at normal town pressure and air at 1 psi. The method also can be applied to bar-heating and other forms of manufacture.

The role of gas in manipulative glass working was demonstrated by personnel of James A. Jobling Ltd., Sunderland, Durham, England. (See *Fig. 1.)* The firm specializes in production of chemical and scientific heat-resisting glassware. Particular applications of gas processes shown stressed the necessity for providing for the reproduction of varying types of glassware within close dimensional tolerances. A forced circulation hot air furnace anneals the finished articles prior to final inspection. The furnace works on predetermined time and temperature cycles for heating, soaking and cooling, thereby eliminating any internal strains which may have been set up during processing operations.

A mobile appliance, designed by Bratt Colbran Ltd., London, for the rapid drying of paint finishes, made its debut at the fair. (See *Fig. 2.)* This equipment, of particular interest to the motor car industry, can dry a patch of paint on the body of a motor vehicle in a matter of minutes. A tubular column, 6 ft 3 in. high, is mounted on wheels and the heating panel is elevated on the column. The panel can be operated at any height up to 6 ft and may be directed onto the paint surface up to an angle of 45° either way from a vertical position. A hood fitted over the panel prevents the heat from being applied at too short a range.

Gas immersion heating, a new development of the South Metropolitan Gas Co., London, was installed in a glass tank to show the internal concentric refractory radiant heating tube. For industrial use the outer tube would be of metal or alloy. Gas and air for combustion are drawn in by fan suction, the flue products being positively discharged to the atmosphere. The heater used was rated at 0.5 therm (100 cu ft) per hour of town gas. Efficiencies of heat transfer to aqueous liquids of 80% and upwards are easily maintained. For large heating requirements the heaters are arranged in parallel, each discharging into a common exhaust duct. The method is being developed for water heating for industrial purposes and is being used in the melting of soft metals.

The British Gas Council also selected for the exhibit a number of gas appliances which typify gas processes in popular use in industry. They included forge, oven and air-blast furnaces; steam boiler; precious metals assay furnace; high speed steel furnace with salt bath for secondary treatment; soft metal melting furnace, and standard japanning oven for drying all types of paint finished articles. Also on display were ancillary plant burners, safety devices, and measuring and controlling instruments.

Flexibility, speed, and economy were emphasized by the council as the prime virtues of gas as an industrial fuel. Gas serves 4000-odd industries and trades in Britain, and industrial demand has increased by 70% since 1938 to the present annual output of 89 billion cu ft. The major exporting industries, such as engineering, steel, motor cars, pottery, glass, textiles, and electrical equipment, depend in great measure upon gas-fired equipment. Such processes as gas infra-red heating, which now dries paint-finished articles in a few minutes as compared to the previous time of several hours, enable manufacturers to use conveyor-belt and other high-speed production systems.

Fig. 1. Forced circulation hot air furnace.

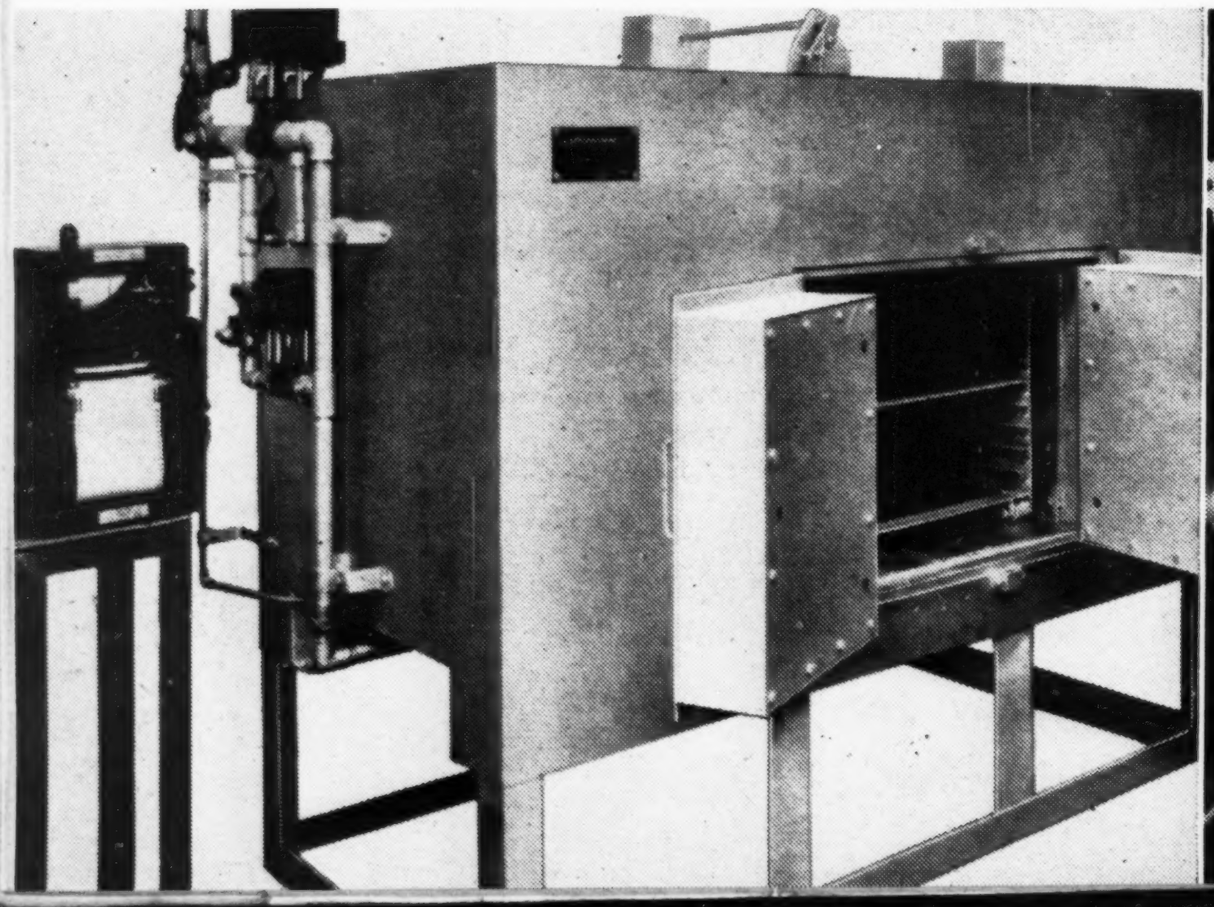
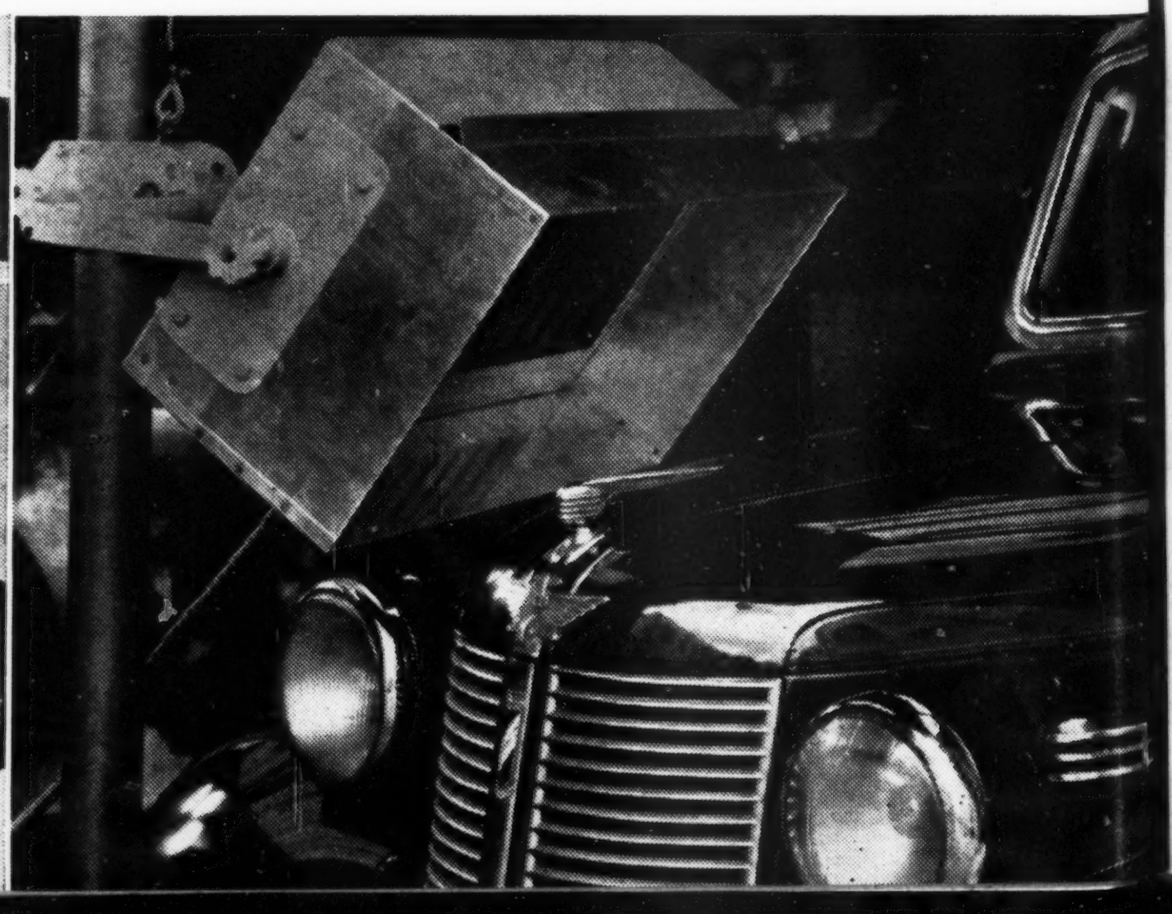


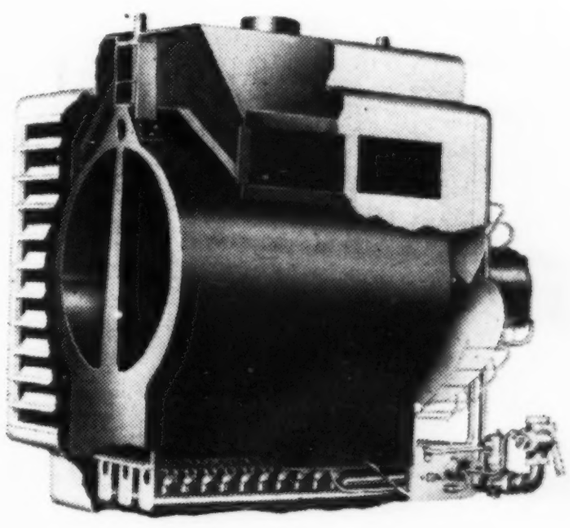
Fig. 2. Gas fired mobile paint dryer.



"I recommend Humphrey Gas Unit Heaters every time and here is why..."

Humphrey Gas Unit Heaters are complete heating plants in themselves, using no steam or water. Gas is burned within the heater, generating an abundance of clean, warm air which is circulated to every corner of the room by the powerful, carefully balanced fan. No fireman is needed for their operation. No fuel storage is required. Automatically controlled by a thermostat, Humphrey unit heaters give carefree heating service day after day at little cost. Known throughout the heating industry as leaders among gas unit heaters, these unit heaters are making fine profits for dealers everywhere.

Humphrey Unit Heaters are ideal for supplying heat to stores, shops, restaurants, garages, factories and countless other places. Made in convenient sizes to fit any heating need. Styled to harmonize with any surrounding furnishings or equipment. Write today for complete literature and prices.



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EXPANSION

Gotham Invaded

Staten Island first to receive natural gas

Supplying natural gas to New York consumers for the first time took place early this month, when the New York & Richmond Gas Co. completed conversion from manufactured gas for some of its 38,000 Staten Island customers.

The changeover of the entire system, which will save an estimated $230,000 in gas bills for customers, will be completed by Nov. 1. Consolidated Edison Co., serving Manhattan and the Bronx; Brooklyn Union Gas Co., Brooklyn Borough Gas Co., and Kings County Lighting Co., serving parts of Brooklyn, and the various companies of the Long Island Lighting System, serving Nassau and Suffolk county and parts of Queens, who are also getting set to shift to natural gas in whole or in part, will not get natural gas until the 1950-51 heating season, as they will buy from the Transcontinental system. New York & Richmond will purchase its gas from Texas Eastern Transmission Corp., which has a line already completed.

Binghamton Happier

Approximately 2400 permits have been given to householders for the installation of new heating gas service, Binghamton (N.Y.) Gas Works announced.

At the same time, Robert E. Williams, district manager of the utility, said that no more permits will be issued until after a review is made of the company's construction program in August.

Permits issued thus far, he said, include all those for which applications were filed up to May 31 and about 200 applications involving "hardship cases" which were filed in June.

Mr. Williams said that 476 applications for service still were pending. These will not be considered until after a review is made of construction of additional pipeline facilities into the area from main supply lines in southern Pennsylvania.

Heat for Brooklyn

Partial lifting of the space heating restrictions as applicable to Brooklyn Union Gas Co. has been authorized by action of the New York Public Service Commission.

Under the new order, Brooklyn Union was authorized to add 2000 new space heat customers after May 17. The company processed, under commission direction, the list of applications on file by customers for space heating facilities. This was to be the determining factor in deciding who would get the new authorizations.

Laclede Speeds Switch

Conversion to natural gas of some 2.5 million burners along the St. Louis area lines of Laclede Gas Co. will be completed by Dec. 1, President Robert W. Otto announced.

The gigantic task of the conversion, being carried on by crewmen from Conversion & Surveys Inc., was begun last May. Company officials expected county adjustments to be completed by the end of last month, figuring three days per district in the area's 30 districts.

Timetable Changed

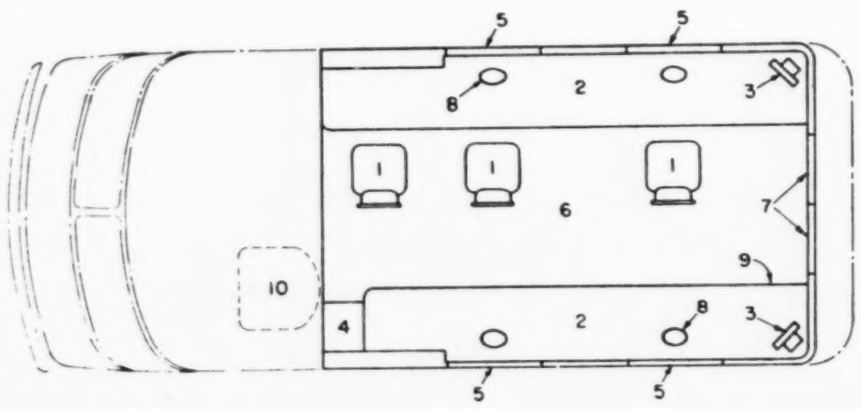
For some time it was expected that natural gas would be available in southern Wisconsin in July 1950, but now the time has been set as "early in 1950." Kenosha, about 37 miles south of Milwaukee, is anxiously awaiting the coming of the gas, and H. M. Pauley, division manager for the Wisconsin Gas & Electric Co., made the above prediction to inquirers.

The company signed the formal contract for natural gas for this area early in June, the gas to come via the pipelines of the Michigan-Wisconsin Pipe Line Co. The Wisconsin Gas & Electric Co., with the main manufactured gas plant at Racine, about 25 miles south of Milwaukee, serves the area south of the latter city and west of Watertown, some 50 miles distant. In some cities and towns of the area propane-air is now being served.

Denver System Grows

Construction of a new natural gas distribution system to provide additional capacity for a growing apartment-house-concentrated district in Denver has been announced by Colorado Public Service Co., gas heating division.

A new 12-in. high-pressure feeder main has been installed for the apartment-house district, "Capitol Hill," which has completed,



1 STOOL
2 COUNTER DESK
3 FAN
4 HEATER
5 WINDOW
6 LINOLEUM
7 DOOR
8 DOME LIGHT
9 SAFE
10 DRIVERS SEAT

You Pay at Your Door in New York

LAST MONTH this attractive new mobile cashier unit went to work for Consolidated Edison, New York, making monthly rounds of 21 Queens borough communities where gas and electric service are provided by Consolidated. Residents in these locations, remote from ConEd's district offices, will save time and money by paying their gas and light bills at the curbside.

Nineteen full-day stops and two half-day stops are made by the unit. Operated by commercial relations department personnel, it is staffed with a minimum of two cashiers. Year-around service — except during possible heavy snows — will be provided.

A Grumman aluminum "Kurb-side" body, mounted on a standard Chevrolet forward control chassis, provides interior space aft of the driver's seat measuring 128 in. long, 78 in. wide, and 70 in. high. Interior arrangement is shown in the drawing. Two cashier windows are located on each side of the truck; only those on the curb side are opened at a specified time. In transit, the aluminum panel, which doubles as an awning, is lowered to cover the windows.

Equipment includes three movable stools, cash drawers, two coin change machines, two adding machines, and portable typewriter.

Dates on which the truck will return to a location for the next two months are included in the receipt stamp imprint.

ct has under construction, about 150 apartment houses. The concentration of dwellers in the area amounts to one quarter of the Colorado capitol's population, or more than 20,000 people per square mile, according to the gas heating division of the Colorado utility. Thus, the new main, including a new pressure regulating station, will be necessary to provide ample gas for heating and cooking during the winter months.

There are a total of 217 apartment buildings which will be served, it was announced by the firm. Low-pressure feeder lines, ranging from 10 to 20 in. in diameter, are being installed. Total cost of the project will be "something more than $130,000," it was announced.

New Base for SoCal

Contract for the construction of a distribution base in the Eagle Rock district of Los Angeles was awarded last month to Meyer Bros. Co., Los Angeles contractors, by SoCal Gas Co.

Plans call for the construction of a base similar in most details to two other recently completed installations. It will include an office building with locker facilities, storeroom and gas automobile storage shed, and an automotive and maintenance and repair building. About 14,000 sq ft of space to the company's facilities will be added by the new base, at an estimated cost of $100,000. The base will be completed by October.

REGULATION

Tie Score

ConEd wins one, loses one in crucial court tests

A court suit involving the alleged overcharge by Consolidated Edison Co. of New York Inc. during a rate changeover period, at the new, higher figure, was decided in favor of the plaintiffs in New York late in June. The company said it would appeal the verdict.

Trouble started when two New York women, through Attorney Harry Lesser, charged illegality in the company's action in pro-rating bills at the new, higher rate granted the company recently. Mr. Lesser cited a public service commission regulation that, in such case, the company must charge at the old rate until the meter has been read. Justice Peter A. Quinn agreed, saying that the case constituted a simple case of overcharge, and that the company was acting against a specific public service commission regulation.

Company officials estimated that if the decision stands, 1,181,000 customers would be affected, and that the returned charge would amount to millions of dollars. Awards in the first case alone, involving two customers, amounted to $26.07.

Not all the news was bad for ConEd, however:

An appellate court overruled the New York Public Service Commission, reversing the PSC order that Consolidated Edison Co. lower its electric rates by $21.5 million annually.

Point of reversal was that the higher court ruled out the PSC action in failing to accept the company's depreciation estimate annually of $200 million, using instead the amount of $100 million. The decrease affected the electric bills for more than 2 million consumers.

Kerr Hits Severance Tax

Robert S. Kerr, senator from Oklahoma, has filed a protest against possible support by the Council of Economic Advisers to a plan which would levy a heavy severance tax on oil and gas products produced in the southwest.

Senator Kerr preceded his protest by a resignation from the National Planning Assn.'s committee of the South, of which he was a member — he did not see an association report to the CEA advocating such levies, revenue from which was to be used for development of other economic resources within the individual states, as insurance against depleted gas and oil supplies.

Gas Wins in AEC Fight

FPC has denied one request for reopening and another for rehearing, in the proceedings involving the recently authorized East Tennessee Natural Gas Co. project to build pipeline facilities to supply 60 MMcf of natural gas daily to the Atomic Energy Commission at Oak Ridge, Tenn.

The two requests were filed jointly by the National Coal Assn., the Railway Labor Executives Assn., and the United Mineworkers of America, all intervenors in the Oak Ridge proceedings.

The first joint application, filed with the FPC in June, asked for a rehearing to reconsider, revoke, and abrogate the commission's findings and subsequent order authorizing the Oak Ridge line. The three organizations charged that FPC predicated much of its findings on representations of the AEC.

The second request asked the commission to reopen the case to hear a report from the subcommittee of the Joint Congressional Committee on Atomic Energy in regard to the proposed line. Previously, the committee had entered a strong protest against the certificate (*GAS*, June, p. 152).

New Furnace Standard

A recommended revision of "Gas Floor Furnaces — Gravity Circulating Type," Commercial Standard CS99-42, has been submitted to manufacturers, distributors, and users for consideration and approval, according to announcement of the commodity standards division of the National Bureau of Standards.

This draft incorporates recommendations from various sources. It provides requirements covering mechanical venting devices; contains several adjustments designed to clarify the intent of certain paragraphs and to improve the technical requirements of others; and has the endorsement of a representative standing committee of the industry.

Mimeographed copies of the recommended revision may be obtained from the commodity standards division, National Bureau of Standards, Washington 25, D.C.

Indiana Case Postponed

At the company's request, the Federal Power Commission has postponed indefinitely the hearing it had scheduled for July 6 to determine whether Indiana Gas & Water Co. Inc., Indianapolis, is subject to FPC jurisdiction (*GAS*, June, p. 21).

The commission also granted the company's request for an extension of time within which Indiana Gas may answer a commission "show cause" order issued within the proceeding of the jurisdictional question. In a concurrent order, FPC permitted the National Assn. of Railroad & Utilities Commissioners to intervene in the Indiana Gas proceedings.

Presentation of AGA McCarter medals and certificates was made recently to four Consolidated Edison Co. of New York Inc. employees. Shown above, left to right, are: G. A. Noseworthy, recipient of medal and certificates; G. W. Travis, Francis Curry, F. C. Shaughnessy, E. L. Griffith, assistant vice president, who presented the awards; E. J. Petzig, J. L. Lufkin, J. J. Cerney, recipient of medal and certificate; and C. E. Hickey.

Rate Slide

Portland's schedules near pre-war after latest dip

Portland (Ore.) Gas & Coke Co. put into effect its third rate reduction since February, in an action taken in June. The reduction totals 3.6 cents per Mcf and brings the company's rates to a point 9% above the pre-war level.

R. G. Barnett, vice president, said that the reductions were the result of a 15-cent-per barrel decline in the price of oil on June 1. Under the company's rate structure, the company is required to cut prices 1.2 cents per Mcf for each 5-cent reduction in the price of oil.

Post price is now $1.85, compared with 94 cents in 1941.

An editorial in the Albany (Ore.) *Democrat-Herald* lauded the gas company for the rate reduction, pointing to the action as indicative of the benefits to be derived by keeping utilities in the position of private, competing enterprises, rather than making them publicly owned (and hence less efficient) entities.

Gas Investment Trust

Gas Industries Fund Inc., which will operate a special fund for investing in the securities of companies within the gas industry, was formed recently. It is the first investment company specializing in the gas industry to be formed.

The company proposes, under the Investment Company Act of 1940, to offer 660,000 shares of common stock, par value $1, through an underwriting group headed by White, Weld & Co. Gas Industries Fund Inc. will become an open-end investment company upon completion of the initial public offering of shares.

Colonial Investment & Management Associates will act as financial adviser. James H. Orr, investment and holding company executive, heads the new firm. Ralph E. Davis, petroleum consultant, will act as technical adviser.

THE JOHN ZINK CO., Tulsa, manufacturer of floor furnaces, unit heaters and conversion burners, has recently put into service this "traveling billboard trailer." The trailer is used to deliver carload shipments of the company's products within a 500-mile radius of the factory.

Kentucky's Rates Cut

The FPC, modifying a rate reduction order made last October, has found rates charged by Kentucky West Virginia Gas Co. for gas sold to Pittsburgh and West Virginia Gas Co. and Louisville Gas & Electric Co. are excessive, and has ordered the former company to lower its rates by $422,406 annually, based on its 1948 operations.

The previous commission order, based on 1945 operations of Kentucky West Virginia, directed a reduction of $571,284 annually. The case was brought by the city of Pittsburgh in 1945, the charge being that rates for gas delivered in the Pittsburgh area by the Equitable Gas Co. were unjust and unreasonable, and were caused by Kentucky West Virginia's excessive prices to the other two distributing companies.

Washington Rate Probe

An investigation of the rates and charges of Washington Gas Light Co. and two of its subsidiaries (Potomac Gas Co. and Prince George's Gas Corp.) has been ordered by FPC.

Subject at issue is determination of whether rates of the companies under FPC jurisdiction are unreasonable and discriminatory. The Arlington County board of Virginia filed a complaint April 25, asking the commission to investigate rates charged in Virginia by Rosslyn Gas Co., a third Washington Gas Light subsidiary.

Gas Sales Still Climbing

Gas sales by utilities to ultimate consumers in the month of May were 2,544,850,000 therms, an increase of 3% over the amount sold in the same month in 1948, AGA statistics show. For the 12 months ended May 31, total sales amounted to 34,168,540,000 therms, a big 9.9% boost over the 1947-48 period.

For the same periods natural gas sales in May were up 3.1% over 1948, and for the year were up 12.2%. Sales of manufactured gas decreased in May by 3.4% under May 1948, the same percentage as the decrease for this year over last.

Detroit Revenues Target

A rate cut that will lower revenues of Michigan Consolidated Gas Co. by $1.25 million during the remainder of 1949 was ordered by the Michigan Public Service Commission recently. The order halves an earlier temporary emergency surcharge of 14½ cents per Mcf granted the company in January.

A company spokesman said the utility probably would not contest the commission's action.

SEC Procedures Studied

The first of three meetings between representatives of gas and electric industries to determine ways of avoiding unnecessary duplication in reports to the Securities and Exchange Commission was held July 10. The group will meet again this month and in September.

W. G. Bourne Jr., vice president of Commonwealth & Southern Corp., is chairman of the industry committee, which was appointed by the advisory council on federal reports, a council created by the director of the federal budget.

Members of the committee are: Douglas Tonge, American Gas & Electric Co.; Theodore G. Sommerman, Ebasco Services Inc.; Alfred E. Softy, Commonwealth & Southern Corp.; E. H. Gannon, Stone & Webster Service Corp.; and H. C. Hasbrouck; Edison Electric Institute, who is serving as secretary.

Stock Deal Consummated

Common stockholders of United Light & Railways Co. have subscribed for more than 99% of the common stock of American Natural Gas Co., offered them through rights which recently expired. United Light was relinquishing the interest it held in American Natural.

Such unsubscribed stock as remains will be sold by United Light.

Service Unlimited

As he goes about his duties today on a mission for the U. S. Army at a remote spot in the mountains of Costa Rica, Sgt. Earle W. Sherman is convinced of two things: (1) no up-and-coming non-com in faraway places should be without his own personal radio sending and receiving set, and (2) American business is ready to give fast service anywhere.

Having lost a minor part when assembling a Servel refrigerator which he requires to store food and essential medical supplies, the sergeant found the appliance would operate, but not as well as it would with the part. His model is the kerosene fuel type.

In a long-shot effort to solve his problem, he beamed his radio sending station toward the United States. In his Libertyville, Ill., home at 144 W. Park Ave., Richard J. Lyons, Republican candidate for U.S. senator in 1944 and a long-time radio "ham," was demonstrating his own powerful set to two dinner guests. By coincidence, he picked up the sergeant's broadcast.

Mr. Lyons soon was talking to the sergeant's station, TI-2-ZZ, over his own station, W-9-VO, and the military man asked if it would be at all possible for Mr. Lyons to get his message to a Servel dealer at some later time.

"Just hold on," Mr. Lyons said. His two dinner guests were Clayton G. Cassidy, advertising manager of The Peoples Gas Light & Coke Co. of Chicago, a Servel dealer, and Marvin O. Clausen, account executive of Needham, Louis and Brorby, Inc., advertising agency for Peoples Gas.

Mr. Lyons turned the conversation over to Mr. Cassidy who took the parts description and assured the sergeant it would be on the way the next morning. Through the Chicago office of Servel, the part was ordered from the factory at Evansville, Ind., and was rushed air mail to the sergeant a few hours after his appeal was received.

MISCELLANY

Better Copy

Utilities win praise for publication achievements

Four awards were won by Consolidated Edison Co. of New York Inc. in the recent 1949 "better copy contest" sponsored by the Public Utilities Advertising Assn.

First prize was granted in the classification of reports to employees — ConEd's "Con Edison Progress — 1947," an annual report, was cited for its artwork and comprehensive story of the company.

Other awards were presented the company for an interior display of water heaters, a direct-mail piece on care and changing of fuses, and an outdoor advertising program entitled "School's Out."

In the same contest, Citizens Gas & Coke Co. (Indianapolis) was awarded first place for outdoor advertising and second place for public relations newspaper advertising for utilities serving 125,000 customers or less. Three national awards and one third prize were copped in the competition by Philadelphia Electric Co. — the big three were for public relations advertising, institutional advertising, and direct promotional advertising.

Cincinnati Gas & Electric Co. walked off with a total of seven prizes during the contest, including three first places, three second places, and one third.

Floyd I. Fairman, director of public relations and advertising of the Kentucky Utilities Co., was chosen president of the association. Other officers elected were William B. Hewson, Brooklyn Union, first vice president; J. E. Canfield, Wisconsin Power & Light Co., second vice president; P. L. Penfield, Detroit Edison Co., third vice president.

Tin Weight Ceiling Off

The tin and antimony section, U. S. Department of Commerce, has amended Tin Order M-43, bringing the weight of tinplate for gas meters up to pre-war standard.

Restrictions on pig tin during the war made it necessary for meter manufacturers to accept tinplate of 3.3 lb per base box. The new order lifts the weight of tinplate to 6 lb per base box. Tin for use in solder has been raised from 50% ot 60%.

The bill extending the life of tin allocation passed the House and Senate and was signed by President Truman on June 30.

Calendar

August

National Assn. of Railroad & Utilities Commissioners — Hotel Cleveland, Cleveland, Ohio, Aug. 8-11.

September

Mid-West Gas Assn. School & Conference — Iowa State College, Ames, Sept. 6-8.

Pacific Coast Gas Assn. Annual Convention—Santa Barbara, Calif., Sept. 7-9.

New Jersey Gas Assn. — Monmouth hotel, Spring Lake, N. J., Sept. 9.

The Maryland Utilities Assn. Fall Conference—Cavalier hotel, Virginia Beach, Va., Sept. 9-10.

National Butane-Propane Assn.—Jefferson hotel, St. Louis, Sept. 19-21.

Mid-Continent Oil & Gas Assn. Louisiana-Arkansas Division — Roosevelt hotel, New Orleans, Sept. 22-23.

October

National Assn. of Corrosion Engineers, South Central Region—Adolphus hotel, Dallas, Oct. 3-4.

Southern California Meter Assn. Measurement & Control Instrument Exposition — Municipal auditorium, Long Beach, Oct. 4-6.

American Standards Assn. Annual Meeting — Waldorf Astoria hotel, New York, Oct. 11-14.

Texas Mid-Continent Oil & Gas Assn. Annual Meeting—Rice hotel, Houston, Oct. 13-14.

American Gas Assn. Annual Convention—Chicago, Oct. 17-20.

National Metal Exposition—Cleveland, Ohio, Oct. 17-21.

National Safety Congress—Morrison hotel, Chicago, Oct. 24-28.

National Metal Trades Assn.—Palmer House, Chicago, Oct. 26-28.

Independent Natural Gas Assn. of America Annual Meeting — Baker hotel, Dallas, Oct. 31.

November

National Hotel Exposition—New York, N. Y., Nov. 7-11.

Mid-Southeastern Gas Assn.—Raleigh, N. C., Nov. 10-11.

Wisconsin Utilities Assn. Annual Meeting—Milwaukee, Wis., Nov. 21-23.

American Society of Mechanical Engineers Annual Meeting—New York, N. Y., Nov. 27-Dec. 2.

National Personnel Conference of the Gas Industry—Netherland Plaza hotel, Cincinnati, Ohio, Nov. 28-29.

December

The American Society of Refrigerating Engineers Annual Meeting—Edgewater Beach hotel, Chicago, Dec. 4-7.

January

Southwest Air Conditioning Exposition—State Fair Grounds, Dallas, Texas, Jan. 23-27.

March

New England Gas Assn.—Hotel Statler, Boston, Mass., March 23-24.

Southern Gas Assn.—Galveston, Texas, March 27-29.

April

AGA Distribution Motor Vehicle & Corrosion Conference—Book Cadillac hotel, Detroit, Mich., April 3-5.

AGA Sales Conference of Industrial & Commercial Gas Section—St. Louis, Mo., April 4-6.

Mid-West Gas Assn.—Hotel Lowry, St. Paul, Minn., April 10-12.

National Petroleum Assn.—Hotel Cleveland, Cleveland, Ohio, April 12-14.

National Conference of Electric & Gas Utility Accountants—Brown hotel, Louisville, Ky., April 17-19.

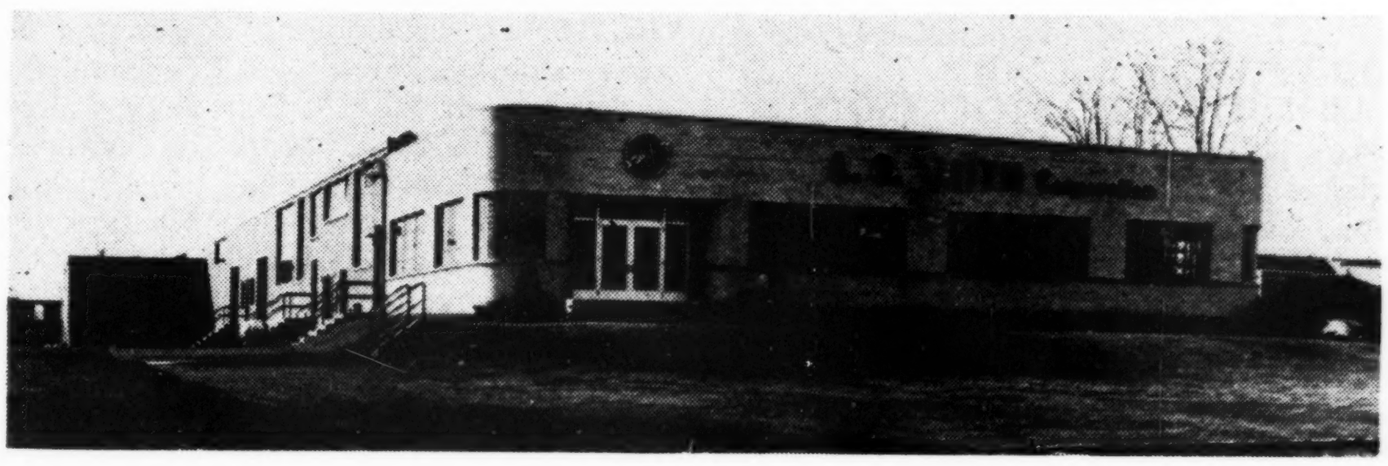
Odor Removal Project

Work was completed last month on instalation of a Southern California Gas Co. pilot plant to test processes to be used for the removal of mercaptans from Texas gas at the Southern Counties Brea-Olinda station. Cost of the plant was $35,000.

The pilot plant will handle up to 2 MMcf daily and is flexible enough to test any fixed-bed process for removal of the mercaptans which cause the somewhat objectionable odor of the Texas gas. The odor has caused the company an increased number of complaints from customers ever since introduction of Texas gas into the system late in 1947.

Under New Management

Effective with the June 1949 issue, ownership of the *American Gas Journal* passed from the estate of the late Stanton G. Krake to a new group composed of E. Holley Poe, Elliott Taylor, and Lewis Hohl. Mr. Taylor is serving as editor, and the publication office remains at 53 Park Place, New York 7, N.Y.



THE NEW HOME of the product service division of A. O. Smith Corp., in Union, N. J., hosted visitors at an open house in June. The new plant maintains a $1 million inventory of Smith parts, and boasts a 24-hr. off-the-shelf replacement service.

ASSOCIATIONS

Chicago Target

Gasmen will converge there for great AGA convention

Thirty-three gas industry executives have been selected by the AGA general nominating committee, and their names will be submitted to the membership for election at the association's annual convention in Chicago, Oct. 17-20. It is estimated that about 6000 persons will attend the meeting whch will have as its theme, "Gas Has Got It."

Hugh H. Cuthrell, The Brooklyn Union Gas Co., has been nominated for president; D. A. Hulcy, Lone Star Gas Co., for first vice president; George F. Mitchell, The Peoples Gas Light & Coke Co., for second vice president; and Edward F. Barrett, Long Island Lighting Co., for re-election as treasurer.

Slated for two-year directorships are Edward G. Boyer, Philadelphia; H. R. Cook Jr., Baltimore; E. H. Eacker, Boston; Joseph N. Greene, Birmingham; Stanley H. Hobson, Rockford; R. H. Lewis, Pittsburgh; Frederick A. Lydecker, Newark; J. F. Merriam, Omaha; Dean H. Mitchell, Hammond; James S. Moulton, San Francisco; J. French Robinson, Cleveland; Paul R. Taylor, New York; Thomas Weir, Ontario; Harry K. Wrench, Minneapolis; and C. H. Zachry, Dallas. Charles G. Young, Springfield, has been nominated to fill a vacancy in a term expiring October, 1950.

Other nominations are as follows: laboratories' managing committee — Arthur F. Bridge, Los Angeles, chairman, and C. E. Bennett, Pittsburgh, vice chairman; accounting section — John H. W. Roper, Washington, D.C., chairman, Alan A. Cullman, New York, vice chairman; industrial and commercial gas section — D. W. Reeves, Tulsa, chairman, Carl H. Lekberg, Hammond, vice chairman; manufacturers' section — Carl A. Schlegel, Philadelphia, chairman; publicity and advertising committee — R. G. Barnett, Portland, chairman, C. J. Allen, Waterbury, vice chairman; residential gas section — H. Preston Morehouse, Newark, chairman, C. H. Horne, Birmingham, vice chairman; technical section — Ernest G. Campbell, Chicago, chairman, and R. Van Vliet, Stapleton, Staten Island, vice chairman.

Various sections of the association are making their headquarters in different hotels, thus enabling members to register at the hotel selected by the section in which they are most interested. The Accounting Section will use the Palmer House as its headquarters and will conduct separate afternoon meetings. Philip E. Eddy, of The Peoples Gas Light & Coke Co., will speak at one of the accounting sessions. Leland Balch, Lowell Gas Light Co., will give a paper on accounting for bottled gas, and J. F. Farley, New York State Electric & Gas Corp., will discuss employee relations.

Activities of the Industrial and Commercial Gas Section will be held Oct. 19 at the Hotel Sherman. Topics selected include "Sales Techniques to Meet Tomorrow's Competition,"

HUGH CUTHRELL

. . . moves to the top

"New Developments in Furnaceless Heating," and "Auxiliary Equipment for the All-Gas Commercial Kitchen." At one of the general sessions Frank H. Trembly Jr., The Philadelphia Gas Works Co., will report on the findings of the commercial cooking equipment tests being conducted by AGA.

The AGA Insurance Committee will conduct a conference for all interested members on Oct. 19 at the Sherman. The home service round-table will be held at the Sherman the same day, and the home service breakfast is scheduled for that morning at the Palmer House.

Reports on the Court of Flame campaign, the Old Stove Round-Up, the Gas House Heater Contest and the Gas Summer Air Conditioning Contest will be presented at the Residential Gas Section meeting on Oct. 18 at the Hotel Sherman. Scene of the Technical Section gatherings will be the Morrison hotel.

Ned H. Dearborn, president of the National Safety Council, will deliver an address, "Safety Is Your Business," at one of the general sessions. In addition to general session speakers sponsored by sections and committees, the program will include Robert W. Hendee, president, Colorado Interstate Gas Co. and AGA president, whose topic is "The '49 Round Up," and Frank J. Nugent, GAMA president, who will review the gas appliance situation from the manufacturers' standpoint. Harry S. Beers, vice president of Aetna Life Insurance Co., will talk on group pension and annuity plans, and Henry T. Heald, president, Illinois Institute of Technology, will discuss new developments in technical education of employees.

Cunningham for ASME

James D. Cunningham, president of Republic Flow Meters Co., Chicago, is the 1950 nominee for president of The American Society of Mechanical Engineers. He heads a slate of new officers submitted by the nominating committee during the society's semi-annual meeting in San Francisco, June 27-July 1. Four regional vice presidents and two directors-at-large also were nominated. Formal election will take place in the fall by letter ballot.

56 for PCGA

Safety, marketing, supply to be convention topics

Significant speakers and topics and an attractive program of social events are promised for the 56th annual convention of the Pacific Coast Gas Assn., scheduled for Santa Barbara, Calif., Sept. 7-9.

Managing Director Clifford Johnstone reports that all gatherings will be general sessions, a practice adopted since the war, and they will be held at Santa Barbara's Lobero theater. The first session, slated for Wednesday afternoon, will be devoted to association matters, including the report of the nominating committee, reports from section chairmen, and addresses by AGA and GAMA representatives.

Various aspects of gas industry safety, marketing and supply problems will be aired by PCGA members on Thursday morning, and the afternoon session will be devoted to a series of addresses on economic subjects by a panel of national authorities. Employee relation problems will be taken up at the final Friday session.

Social events being planned include a Friendship Hour with appliance manufacturers as hosts, the president's ball, a golf tournament, and teas, luncheons and tours for the ladies.

Chairmen of convention committees are the following: Program, Robert A. Hornby; convention arrangements, George W. Smith; hostess, Mrs. A. F. Bridge; entertainment, M. L. Fort; properties, F. B. Wright; housing, C. H. Potter; registration, R. F. Ogborn; transportation, W. M. Minyard; publicity, Otto C. Mauthe; convention newspaper, J. T. Van Rensselaer; and golf, George H. Finley.

Calendar for SGA

Twenty-six round table conferences will be held in 15 cities by the Southern Gas Assn. during 1949-50. The following schedule of topics and dates has been released by the association:

Accounting section. Materials and supplies accounting — Atlanta, Oct. 24; Shreveport, Oct. 28. Customer accounting — Mobile, Feb. 3; Tulsa, Feb. 10.

Sales section. Sales executives' conference — Jackson, June 30-July 1. Commercial sales — Macon, Aug. 29; Fort Worth, Aug. 22. Home service workshop—Savannah, Sept. 12; Austin, Sept. 9. Industrial sales — Dallas, Oct. 10. Air conditioning engineering and sales—Houston, Nov. 17-18. Residential sales —Birmingham, Jan. 13; Little Rock, Jan. 20.

Operating section. Work on customers' premises — Nashville, June 17; Oklahoma City, June 24. Transmission — Houston, June 27. Dispatchers — Tulsa, July 11. Corrosion and cathodic protection — New Orleans, July 22. Distribution operating problems — Atlanta, Sept. 16; Fort Worth, Sept. 19. Accident prevention — New Orleans, Sept. 22. Transmission — Shreveport, Sept. 30. Meter and regulator — Houston, Feb. 9-10.

Employee relations section. New Orleans, Sept. 23; Atlanta, Jan. 27; Dallas, May 23.

The Sales Appeal of Work-Saving
KNOWS NO SEASON!

If you have a salesman who pulls his punches on Clothes Dryer selling in Summer, tell him he simply isn't facing FACTS. There are more than fifty good reasons why women want Hamilton Dryers, and fine weather doesn't change a one of those reasons.

"But," your man may say, "they can dry clothes outdoors in fine weather!" So?

So they can do a lot of other things outdoors that are far more fun than basket-lugging and clothes-pinning! Such as golfing, swimming, sailing, driving, or even just plain loafing on the lawn. Clothes Dryers are bought because they save toil and time . . . and toil and time saved in Summer is worth double!

[PICTURE OF A WOMAN HANGING OUT THE FAMILY WASH—HAMILTON STYLE]

Hamilton

THE ORIGINAL AUTOMATIC

CLOTHES DRYER

(GAS MODELS)

The Hamilton market is a PLUS market. It's extra —over-and-above all your other appliance markets. It's new, fresh, uncluttered with trade-in headaches. It's a feeder for washer sales, actually, because it makes home laundering so much easier it wins people away from sending their wash to the laundry. If you handle *any* washer or ironer lines, you owe it to your business to line up with Hamilton, and enjoy the added profits you'll earn from selling one of the most *wanted* of all major appliances. Write today—

HAMILTON MANUFACTURING COMPANY, TWO RIVERS, WIS.

In Canada the Hamilton Dryer is known as the Coffield-Hamilton Automatic Clothes Dryer, and is distributed by Coffield Washer Co., Hamilton, Ontario

5 Separate Surveys Tell the Story!

Here's proof that the Hamilton Automatic Clothes Dryer IS one of the most *wanted* of all major appliances.

"1 out of 4"

Out of 7,000 families *in all income groups* questioned by a leading newspaper, 23.6% of the women stated that they wanted an automatic dryer.

"28% Build for It"

Of 4,900 home plans studied, BETTER HOMES & GARDENS Magazine reports 28% of planners had specifically *asked* their architects to provide a place for a Clothes Dryer.

9½% of Home Owners

McCALL'S Magazine found that 9½% of 11,887 home owners asked said they wanted to buy Dryers. They wanted Dryers at the rate of 1 Dryer for every 3 washers!

15.9% Order Dryers

A foremost electric appliance company, in a package-deal made to 1,000 G.I. customers, arranged for them to order extra equipment, if they wished—and 159 out of the 1,000 or 15.9% ordered Dryers. They ordered Dryers at the rate of 1 Dryer to 3 washers!

The Girls want Dryers

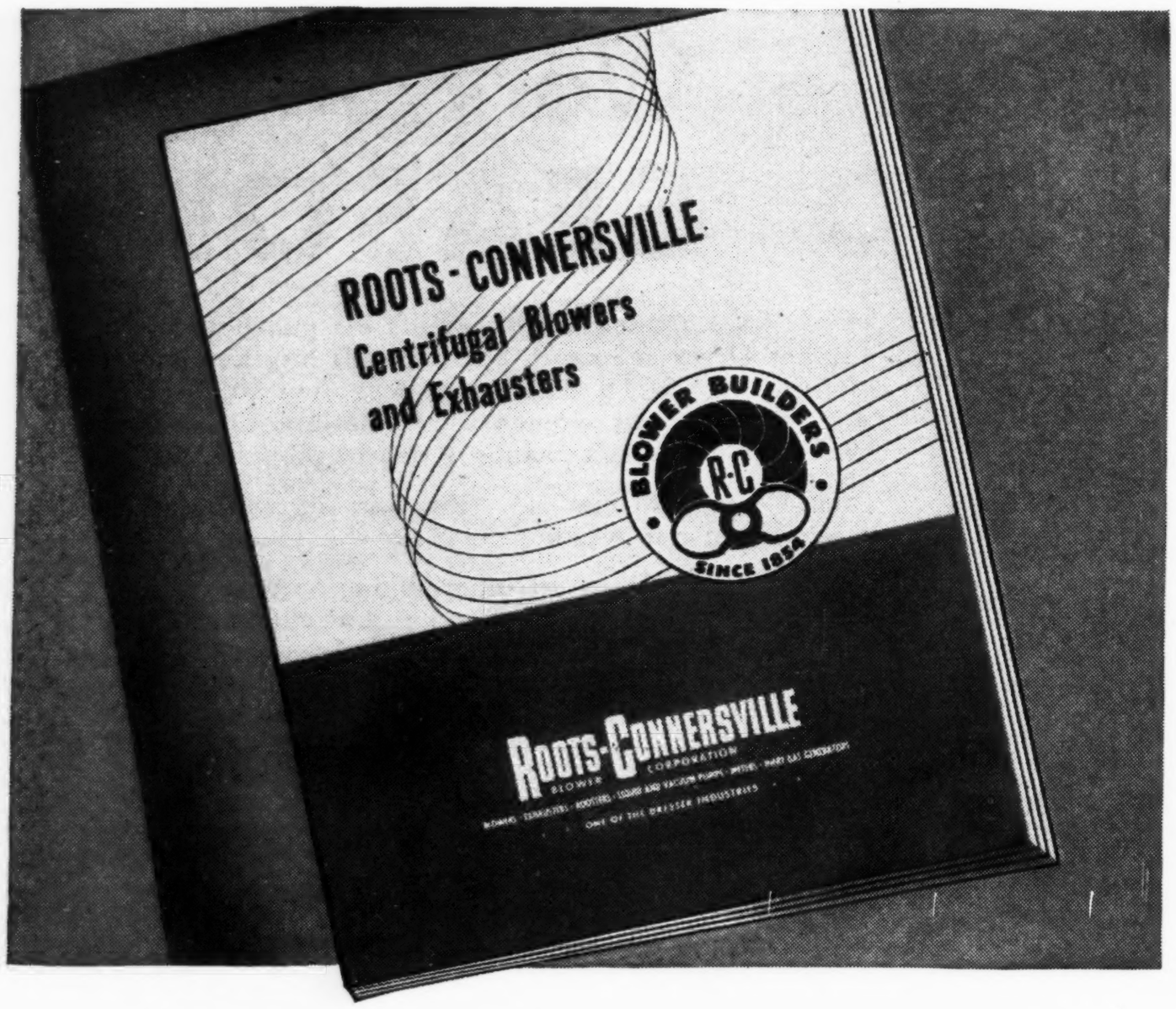
A survey of girls at Stephens College showed more of them wanted Dryers in their homes than ironers —and that just as many wanted Dryers as wanted washers!

19 million readers of these great national magazines . . .

—are being told and retold, reminded repeatedly, persuasively, of how much comfort and convenience a Hamilton Dryer will mean to them.

as advertised →

—in Good Housekeeping, The Saturday Evening Post, Better Homes and Gardens, McCall's, House Beautiful, Parents, American Home, Small Homes Guide.



CENTRIFUGAL BLOWERS...

PRODUCTS OF *R-C dual-ability*

This new bulletin gives you the latest information on Roots-Connersville Centrifugal Blowers and Exhausters. It includes characteristic performance curves; details and illustrations of R-C single-stage and multi-stage units; data on regulation and control; and other pertinent facts to help you select blowers and exhausters. Ask for Bulletin 120-B-14.

Two companion bulletins bring you up to date on Rotary Positive equipment which, with our Centrifugal line, makes up the "*R-C dual-ability* team." We are the only manufacturer that gives you this *dual choice* of air and gas-handling units.

ROTARY POSITIVE BLOWERS—Details on design and construction of R-C Rotary Positive Blowers and Exhausters; performance curves and other helpful data. Bulletin 22-23-B-13.

ROTARY POSITIVE GAS PUMPS—Essential data for the selection of R-C Gas Pumps; sizes, capacities, performance curves and other needed information. Bulletin 32-33-B-13.

Complete your files on blowers, exhausters and gas pumps by sending for these three bulletins.

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BLOWER BUILDERS • R-C • SINCE 1854

BLOWERS • EXHAUSTERS • BOOSTERS • LIQUID AND VACUUM PUMPS • METERS • INERT GAS GENERATORS

*** * ONE OF THE DRESSER INDUSTRIES * ***

ASSOCIATIONS

Canada's 42nd

CGA's convention at Bigwin draws 325

The 42nd annual convention of the Canadian Gas Assn., held at Bigwin Inn, Lake of Bays, Muskoka, Canada, June 16-20, will go down as one of the best ever held by the organization. Approximately 325 delegates attended the convention, some coming from distant points of the United States and Canada.

Most of the delegates were pleased to learn that the 1950 convention is to be held at Murray Bay, Quebec, June 19-24.

The nominating committee for the election of officers and members of the executive committee for the coming year brought in the following slate, which was unanimously adopted:

President — Charles M. Seiger, United Gas & Fuel Co. of Hamilton Ltd.

1st Vice President — Hugh G. Smith, Consumers Gas Co. of Toronto.

2nd Vice President — R. M. Perkins, Windsor Gas Co. Ltd.

Executive Committee — Alex MacKenzie, General Steel Wares Ltd.; E. H. Rohrer, British Columbia Electric Railway Co. Ltd.; F. A. Brownie, Canadian Western Natural Gas Co. Ltd. and Northwestern Utilities Ltd.; Carl H. Lutz, Dominion Natural Gas Co. Ltd.; Raymond Latreille, Quebec Hydro-Electric Commission; H. W. Durgy, Dominion Natural Gas Co. Ltd.; P. H. Geldard, Consumers Gas Co. of Toronto; F. R. Palin, Union Gas Co. of Canada Ltd.; Alan H. Harris Jr., Winnipeg Electric Co.; and K. L. Dawson, Nova Scotia Light & Power Co. Ltd. Manufacturers' representatives on the committee are J. W. Ostler, Canadian Meter Co. Ltd. and G. W. Beecroft, Beach Foundry Ltd.

George W. Allen, Toronto, continues as executive secretary and treasurer of the association.

The general program of speakers and papers included a series of practical contributions to the knowledge of the Canadian gas industry.

Dr. Oliver B. Hopkins, vice president of Imperial Oil Ltd., accompanied his talk with some interesting slides showing recent oil and natural gas discoveries in Alberta. His address closed with a movie which detailed the work already being done in the oil and gas fields of Alberta. Developments now under way and the many plans for the future are going to revolutionize the oil and gas business of Canada, especially in the western sections, he implied.

H. D. Valentine, sales promotion manager, Peoples Gas Light & Coke Co., Chicago, made a hit with delegates when he demonstrated the possibilities ahead for all gas companies which take dealer sales cooperation seriously.

C. George Segeler, engineer of utilization for the American Gas Assn., stressed the need for gas managers to know the facts concerning competitive forces outside their business. Charts, which he used throughout the talk, showed the standing of gas and electric com-

petitive factors, and he demonstrated how far the gas appliance manufacturers have gone to bring out unbeatable models in gas ranges and water heaters.

W. L. Dutton, operations engineer, Union Gas Co. of Canada Ltd., Chatham, Ontario, discussed his company's recent plans to establish radio contact with its many outlying stations in western Ontario. His paper, titled "FM Radio Communication," was illustrated with illuminated charts, and at the close of his talk, delegates saw and heard an actual demonstration of the company's system. A set was installed in the sessions hall, and communication was made back and forth with a second station on a truck located across the Lake of Bays.

An address which covered much of Canada's historical and gas industry development was delivered by T. Pates Pinckard, general manager, United Gas & Fuel Co. of Hamilton Ltd. The humorous manner in which Mr. Pinkard illustrated "Canada and the Gas Industry" added to the good feeling which prevailed throughout the sessions.

Three other practical papers were those by Milton W. Heath of Wellesley, Mass., who spoke on "How to Account for your Unaccounted For Gas"; "Catalytic Reforming and Thermal Cracking," by Edwin L. Hall, director of the AGA Testing Laboratories, Cleveland; and "The High Btu Oil Gas Plant, Port Stanley, Ontario," by H. E. Merrill, chief engineer, Dominion Natural Gas Co. Ltd., Buffalo, N. Y.

A session on Friday evening consisted of demonstrations by the Dearborn Chemical Co. Ltd. and the Toronto Iron Works Ltd., both of Toronto. The Dearborn firm used a sound film which illustrated the coating and wrapping of underground piping systems. The Toronto Iron Works talk, given by John H. Wiggins, of the Chicago headquarters of General American Transportation Corp., covered the subject of the recently improved waterless gas holder.

New Lab Procedure

The AGA Laboratories have announced a new policy, effective late in June, of accepting appliances and accessories for testing on a reservation basis.

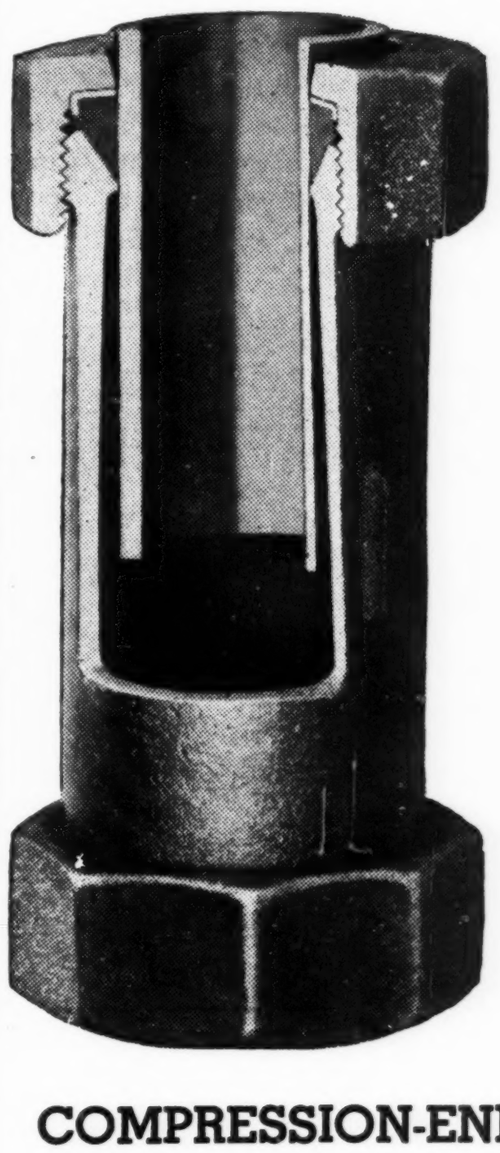
A manufacturer may inform the laboratories by letter of the date he intends to have his appliance in Cleveland or Los Angeles for test. The lab then advises the manufacturer of the earliest tentative test date, and the appliance must arrive at the laboratory one week prior to this date. If it is necessary to change the test date, the manufacturer will be notified.

Benefits expected as a result of the new policy are that requirements for storage space at the laboratories will be reduced and, since appliances need no longer stand in line for test, two to four weeks may be saved in obtaining approval.

Short Course on Corrosion

For persons who must deal with corrosion problems, but have not had the experience or background to do so efficiently, the National Assn. of Corrosion Engineers, Houston, has scheduled a Short Course on Corrosion to be held Sept. 12-16 at the University of Texas,

NORMAC
COUPLINGS, SLEEVES and FITTINGS

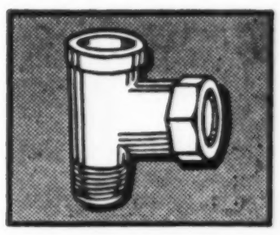


for maximum deflection, ease of "stabbing," complete confinement of the rubber!

So close are "Normac" rubbers confined at the gasket tip that possibility of flow is reduced almost to "nil." These couplings, sleeves and fittings . . . approved by gas utility men across the country for their time-saving features, ease of handling and dependable service . . . are available in a complete range of sizes. Made from air furnace malleable iron they provide greater wall thickness than pipe on which used.

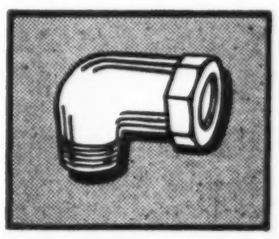
NORMAC COUPLINGS are made with 5" centers in all sizes. NORMAC SLEEVES are identical in design except that they are made with 10" centers. Nuts and gaskets are interchangeable.

COMPRESSION-END SERVICE "TEE"



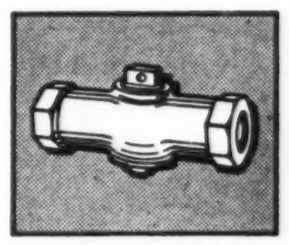
First fitting of this type ever produced with full coupling depth and special threads on male end to prevent dropping into old hand taps when used to replace standard threaded fittings.

COMPRESSION-END SERVICE "ELL"



Extra depth makes it possible to "stab" pipe into stops and without measuring, pull back a safe distance to allow ultimate deflection eliminating possibility of strain against tap in main.

COMPRESSION-END IRON BODY BRASS CORE SERVICE STOPCOCKS



End the necessity of threading on the job plus the elimination of the threads themselves — combining all the advantages of NORMAC COUPLINGS and the best in stopcock design. 2½" coupling depth on each end.

NORMAC BRASS FITTINGS DEVELOPED IN 1939 FOR USE WITH COPPER TUBING

Our complete line of brass fittings can be used either on new installations or where copper is run through old steel pipe in large or small openings. The center to end dimensions of NORMAC TEES correspond with old malleable iron fittings. This feature is extremely important in the use of these fittings in one foot openings where the tubing must line up with the steel which has been removed.

Write for the NORMAC CATALOG of Gas Distribution Equipment

NORTON-McMURRAY MFG. CO.

39 SOUTH LA SALLE ST. • CHICAGO 3, ILLINOIS

Couplings • Meter Bars • Sleeves • Cocks • Bell Joint Clamps • Service Tees & Ells

Austin. Dr. Norman Hackerman of the university faculty is assisting NACE officers in making arrangements for the course.

Nine two-hour lectures, followed by discussion periods, are being planned. Two lectures will be devoted to background, such as consideration of pertinent aspects of thermodynamics, kinetics and electrochemistry. The other lectures will embrace detailed consideration of corrosive process and prevention.

Housing for 170 will be available on the university campus at a cost of $1.50 per night. Registration fee for the course has been set at $20. Applications for official registration blanks are being received by A. B. Campbell, NACE executive secretary, 905 Southern Standard Bldg., Houston.

N.Y.-N.J. Conference

Keynote of the New York-New Jersey Regional Sales conference held June 20-21 at the Essex and Sussex hotel, Spring Lake Beach, N.J., was the vital need of intensive effort in sales promotion and training to enable gas utilities and appliance manufacturers to meet present competitive conditions.

Walter G. McKie, Rochester (N.Y.) Gas & Electric Corp., was chairman of the conference and head of the program committee. At the opening session Stanley C. Gorman, sales promotion director of GAMA's Water Heater Division, gave an up-to-date report on the Court of Flame campaign.

Other speakers and topics included R. F. Brower, Consolidated Edison Co. of New York, who discussed problems to be faced when natural gas reaches New England; W. N. Brown, Hamilton Manufacturing Co., reporting sales and promotional techniques designed to increase gas clothes dryer sales; and R. A. Plata, New York & Richmond Gas Co., who talked about using the New Freedom Gas Kitchen program to promote appliance sales.

H. Carl Wolf, AGA managing director, served as moderator for a symposium devoted to methods of meeting competition in the cooking and water heating fields.

Air Conditioning School

A two-day "shirtsleeve and overall" service school on Servel gas air-conditioning units will be held in connection with the Mid-West Gas Assn. School and Conference at Ames, Iowa, Sept. 6 and 7.

Only a limited number of servicemen can be accommodated, and companies interested in sending one or more men to the school are asked to contact Carl Olson, Central Electric & Gas Co., Lincoln, Neb.

Servicemen will have no time available for attendance at other meetings of the conference except the banquet. Participation in the service school will be permitted by reservation only.

PEOPLE

GEORGE S. JONES JR. has been named vice president and assistant to the president of Servel Inc., Evansville, Ind. Since 1936 he has been vice president in charge of sales. JOHN K. KNIGHTON moved up from assistant vice president in charge of sales to general sales manager. Mr. Knighton has announced the following personnel changes: O. F. KEUNE from southeastern regional manager to assistant general sales manager; H. M. WICKMAN from sales manager of the household refrigeration division to assistant general sales manager on special assignment; J. C. KELLNER JR. to manager of the new appliance service department and EMIL NENSEL from manager of the water heater service department to assistant manager of the new department; L. D. EASTMEAD to succeed Mr. Keune and R. G. WILLIAMSON to succeed Mr. Eastmead as district manager in Georgia, Alabama and Tennessee. T. O. HARD, C. A. SPIEGEL and J. T. MOONEY, former members of the household refrigerator sales department which has been discontinued, have been assigned to Mr. Keune's staff for specialized field sales activity. Also appointed to this specialized sales pool are D. P. FINNEY, ROBERT CLARK, L. W. HADLEY and E. C. WHITCOMB, who were Servel dealer managers. A. J. GILBREATH, another former dealer manager, has been transferred to the company's international division as manager of sales for air conditioning.

ARTHUR STOCKSTROM, president of American Stove Co., St. Louis, has announced some major personnel changes in the company. THOMAS M. SOURBECK, 73, will retire Oct. 1 as manager of the firm's Lorain, Ohio, division, and STANLEY E. LITTLE,

Your Hot Water Heater Production Costs go DOWN

WITH NEW MODEL 50 GASAPACK

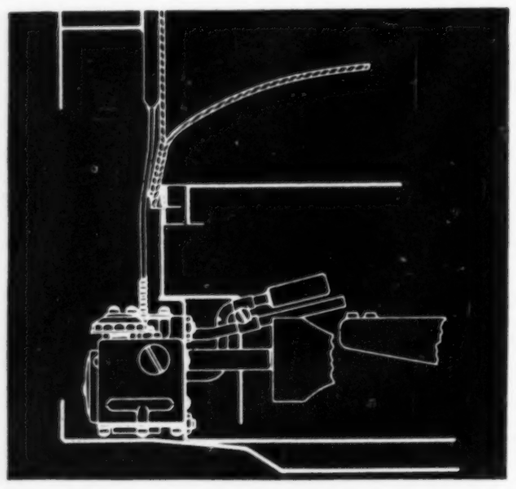
- COMPACT ALL-IN-ONE UNIT requires only three bolts to mount to your Heater.
- ELIMINATES THERMOSTAT SPUD — Sensitive GASAPACK Thermostat Bulb straps on *outside* of tank wall.
- MOUNTS IN ANY POSITION — vertical or horizontal, inside or outside of heater casing.
- CAN BE CONNECTED DIRECTLY TO BURNER ORIFICE — location not restricted by bulb position.
- COMPACT, REQUIRES LITTLE SPACE.

These GASAPACK advantages will save you the cost of extra piping, fittings, assembly time, installation time and labor, and many other production costs. In addition: you get sensitive dependable Thermostatic Hot Water Control that improves your heater performance.

PROTECTED GAS CONTROLS PERFORMANCE

GASAPACK includes: Automatic Safety Pilot, Thermostatic Valve, Gas Cock, and Pilot Filter (where required) in one compact unit. It can be used with ALL GASES.

Horizontal Mounting of GASAPACK. Note Burner orifice mounted directly to control.



AUTOMATIC PRODUCTS COMPANY
2526 NORTH THIRTY-SECOND STREET
MILWAUKEE 10, WISCONSIN

DEPENDABLE Controls
FOR HEATING . . . AIR CONDITIONING . . . REFRIGERATION

vice president in charge of sales, will become the new Lorain manager. GEO. E. BAKER resigned as treasurer because of ill health, and LLOYD C. GINN resigned as advertising and sales promotion manager. MARC W. PENDER, former market research manager, has been elected vice president in charge of sales; CLARK P. FISKE is the new treasurer; F. VERN SEMPLE, chief accountant, succeeds Mr. Fiske as assistant secretary and assistant treasurer; and HAROLD H. GEARHART, former accountant, is now controller, a newly created office.

F. S. WADE, president and general manager of Southern California Gas Co., Los Angeles, relinquished the title and duties of general manager on Aug. 1. He retains the position of president, however. F. M. BANKS, former vice president and assistant general manager, is now vice president and general manager. At a recent meeting the directors elected W. M. JACOBS, manager of general sales, to the position of vice president. Mr. Jacobs will have charge of sales, advertising, and customer service and accounts. FRANK FOSTER, manager of residential sales, has taken over Mr. Jacobs' former post.

ROBERT E. SEXMITH has been appointed West Coast manager of Ansul Chemical Co.'s new Pacific coast division. The Marinette, Wis., firm is selling and servicing Ansul dry chemical fire extinguishers in the territory formerly served by Snowden Chemical Co. of Modesto, Calif. Ansul has opened offices in Los Angeles, Fresno and Oakland.

FLORA G. DOWLER, home service supervisor of The Manufacturers Light & Heat Co., Pittsburgh, has received a citation from the American Red Cross in recognition of her volunteer work as an instructor of nutrition classes and canteen groups during World War II.

WILLIAM H. PARK, division manager of Pacific Gas & Electric Co., San Francisco, took office July 1 as president of the Oakland Chamber of Commerce.

EL ROY L. PAYNE has just announced the formation of two new companies of importance to the gas appliance industry in California. The E. L. Payne Heating Co. has purchased the assets of the Payne Beverly Hills retail department from Affiliated Gas Equipment Inc. The new retail company will operate a trained staff of gas heating designers, installers and servicemen for all types of heating equipment in the Beverly Hills and Los Angeles metropolitan area, with headquarters at 9242 Beverly Blvd., Beverly Hills, Calif.

El Roy Payne

The second company will be known as the Beverly Heating Supply Co., operating from the same address, and will act as distributor and wholesaler of all types of gas burning equipment, with warehouse facilities, and will distribute to heating contractors and dealers throughout the state of California.

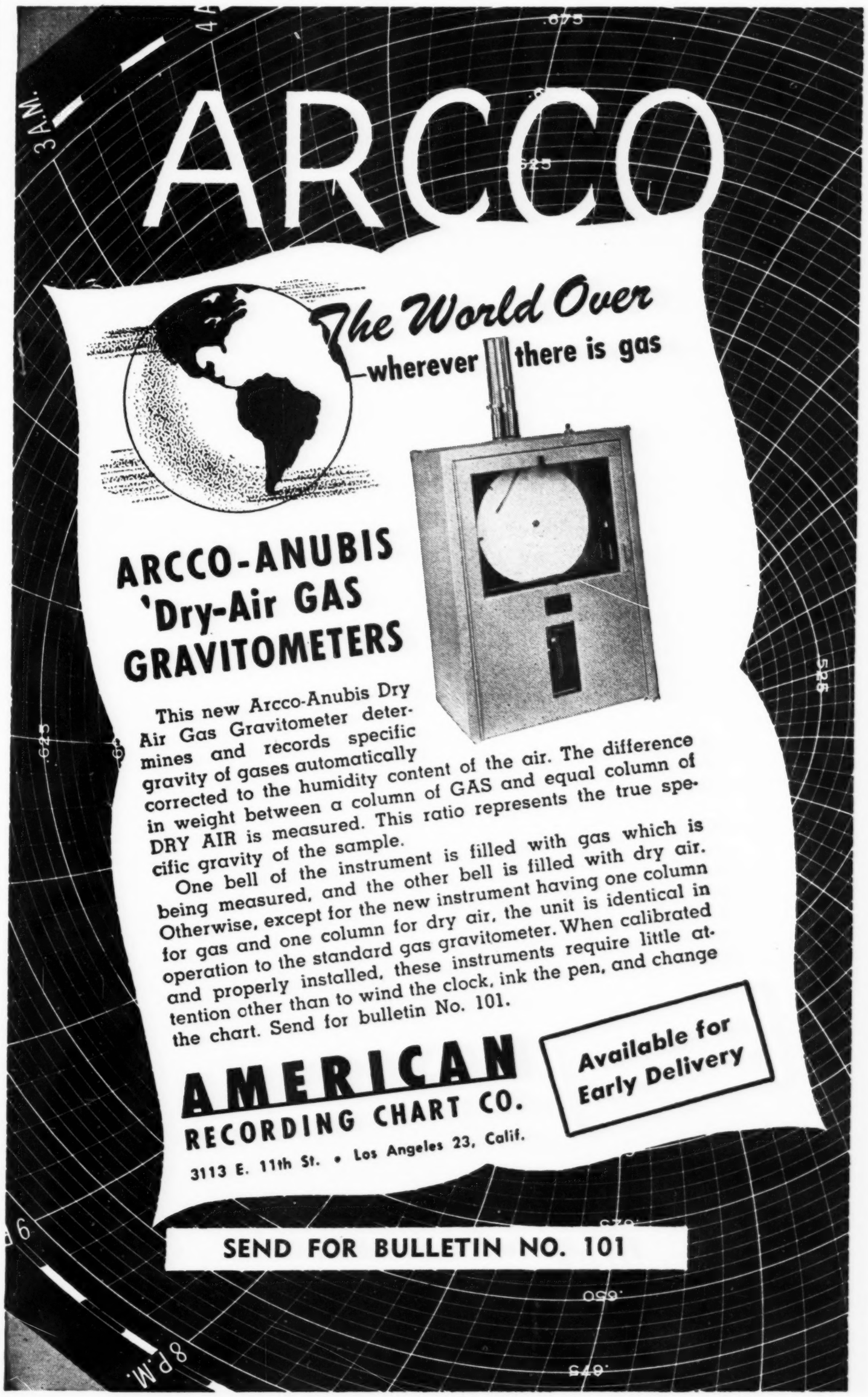
Mr. Payne is one of the pioneers in the gas heating industry. Entering the industry in 1914, he developed the unit gas furnace and became the largest manufacturer of this type appliance in the United States. His company was purchased in 1945 by Dresser Industries.

Mr. Payne is well known to the entire gas industry and active in association affairs. He served as a director for the PCGA in 1931-32 and again in 1945. He was chairman of the Manufacturers Section during 1934-35. In 1943 he was elected vice president of PCGA and in 1944 served as its president.

Mr. Payne served on several committees for the American Gas Assn. He was one of the original members of the Laboratory Committee on Central House Heating.

J. G. ROLLOW, supervisor of engineering, gas production and transmission department, Southern California Gas Co., Los Angeles, retired on July 1. Mr. Rollow became affiliated with the Los Angeles Gas & Electric Co. in 1920 as a consulting engineer, and he continued as a supervising construction engineer for SoCal when the two companies merged.

W. J. BERRY has been added to the staff of Dearborn Chemical Co., Chicago, as pipeline service engineer. He will headquarter in Chicago but will devote his time to field work on pipeline construction projects. Dearborn's Iowa, Nebraska, and South Dakota territory will be handled by R. F. HUTCHINSON, who was recently added to the sales staff.


ARCCO
The World Over
wherever there is gas
ARCCO-ANUBIS
'Dry-Air GAS
GRAVITOMETERS
This new Arcco-Anubis Dry Air Gas Gravitometer determines and records specific gravity of gases automatically corrected to the humidity content of the air. The difference in weight between a column of GAS and equal column of DRY AIR is measured. This ratio represents the true specific gravity of the sample.
One bell of the instrument is filled with gas which is being measured, and the other bell is filled with dry air. Otherwise, except for the new instrument having one column for gas and one column for dry air, the unit is identical in operation to the standard gas gravitometer. When calibrated and properly installed, these instruments require little attention other than to wind the clock, ink the pen, and change the chart. Send for bulletin No. 101.
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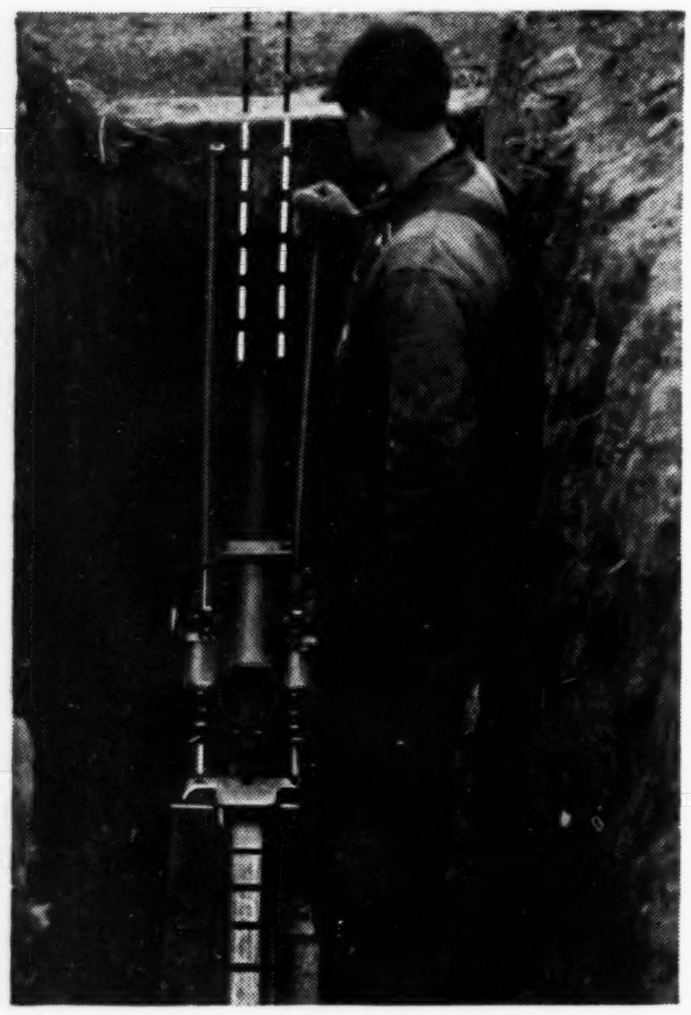
RECORDING CHART CO.
3113 E. 11th St. • Los Angeles 23, Calif.
Available for Early Delivery
SEND FOR BULLETIN NO. 101

PUSH PIPE

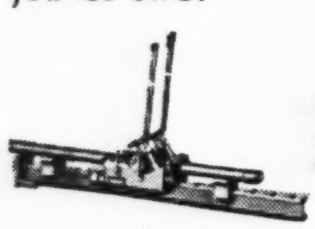
UNDER STREETS, WALKS,

TRACKS, FLOORS



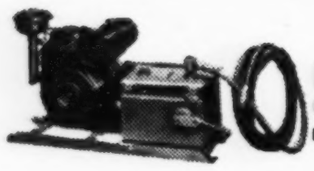
...with a GREENLEE PIPE PUSHER

Yes, here's the quick and simple way to install underground pipe. With a GREENLEE Hydraulic Pipe Pusher *one man* pushes pipe *under* obstacles. No tearing up of pavement, lawns, floors... eliminates extensive ditching as just a short trench accommodates the Pusher. No tedious tunneling, back-filling, tamping, or re-paving. Job time is cut to a fraction. Pusher often pays for itself through labor savings on the first job or two.



No. 790 GREENLEE PUSHER
For 3/4 to 4-inch pipe. Six Speeds—6,500 to 40,000 lbs. pushing pressure.

No. 795 GREENLEE PUSHER
For pipe larger than 4-inch, concrete sewer pipe, large drainage ducts. Six speeds—25,000 to 150,000 lbs. pushing pressure.



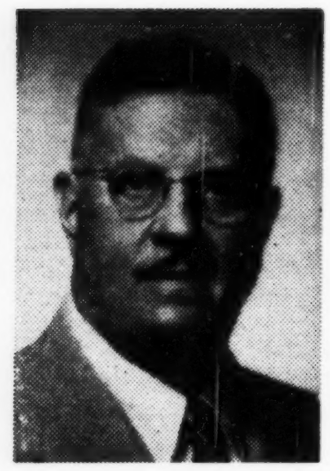
POWER PUMP for both sizes of GREENLEE Pushers. Pushes pipe at rate of two feet per minute.

TOOLS FOR CRAFTSMEN
GREENLEE

Get facts on timesaving Greenlee tools now. Write Greenlee Tool Co., Division of Greenlee Bros. & Co., 1948 Columbia Avenue, Rockford, Illinois, U. S. A.

Gordon Walker
. . . Milwaukee Gas

GORDON F. WALKER has been assigned to represent the Milwaukee (Wis.) Gas Specialty Co. in the Eastern territory with headquarters at Philadelphia. Mr. Walker, a mechanical engineer, has several years of experience in design and liaison engineering in the machine trades. After completing his studies at the Universities of Wisconsin and Nebraska, he was engaged in structural and mechanical design with Glenn L. Martin, Nebraska Co., and Allis-Chalmers Manufacturing Co. of Milwaukee. Following service in the Navy, he joined the Milwaukee Gas Specialty sales engineering staff.



Stephen D. Day
. . . Ruberoid

STEPHEN D. DAY, vice president of Pipe Line Service Corp. since 1944, has opened his own office at 2017 W. Gray, Houston, and is handling the Ruberoid Co.'s asbestos pipeline felt and other related products. Mr. Day went to Houston in 1930 to introduce coal tar enamel coating for the Barrett Co. In 1931 he went to California to promote the use of coal tar enamel. He was associated with Barrett until 1944, and in 1942 he sold the protective coating for the Big Inch line.

DONALD T. HOWELL has been elected assistant secretary and assistant treasurer of United Gas Corp. Shreveport, and will be in charge of the company's recently opened New York office. United Gas stock held by the Electric Power & Light Corp. is being distributed to stockholders because of the proposed dissolution of the latter company, and the New York office has been opened to handle that transaction. New United Gas directors include CLIFTON L. GANUS of New Orleans, BURKE BAKER of Houston, and GEORGE G. WALKER of New York.

H. DALE COOK has been named manager of the industrial control sales division of the Perfex Corp., Milwaukee, succeeding A. B. MEEG. Mr. Cook will handle organization of the Perfex program for sales and distribution of industrial controls and instruments. He formerly served with the General Controls Co. and Minneapolis-Honeywell Regulator Co.

EDWARD P. NOPPEL has been elected a vice president of Ebasco Services Inc., New York, of which he has been a director since 1942. He has been associated with the company and its parent, Electric Bond & Share Co., since 1925. Mr. Noppel is a director of the American Gas Assn. and chairman of its research planning committee.

E. J. Bjorenson
. . . Griffiths

E. J. BJORENSON has been named direct factory representative for the Southeastern states by E. F. Griffiths Co., Philadelphia. Mr. Bjorenson has completed intensive factory training and is already calling on the trade in his territory.

Edward C. Homes
. . . Vulcan Proofing

EDWARD C. HOMES has been appointed manager of Vulcan Proofing Co.'s (Brooklyn, N.Y.) diaphragm division, and he will be in charge of production and sales. Mr. Homes has been promoting the sale of synthetic meter and regulator diaphragms in the Midwestern states for the past three years. Before joining Vulcan, he was employed for 19 years as superintendent of meters and assistant superintendent of the West Side plant for Milwaukee Gas Light Co. J. K. VETTER has replaced Mr. Homes as Vulcan's Midwestern representative. Mr. Vetter formerly was affiliated with The Gas Consumers Service on the East Coast and with The North Shore Gas & Electric Co. at Waukegan, Ill.

F. W. SHARP recently was elected vice president and treasurer and STANTON S. FAVILLE, secretary and general attorney of American Natural Gas Co., successor to American Light & Traction Co. Mr. Sharp was first assistant treasurer of the predecessor company and Mr. Faville was an attorney for the firm. Four other officers of American Light are continuing in their same capacity with American Natural Gas. They are WILLIAM G. WOOLFOLK, chairman; HENRY FINK, president; RALPH McELVENNY, financial vice president; and W. F. DOUTHIRT, vice president.

J. K. LAURENTZ has been appointed manager of the auditing department of Brooklyn (N.Y.) Union Gas Co. He has held a number of positions in the company's accounting department, serving as auditor's assistant since 1944. Mr. Laurentz served as chairman of the AGA subcommittee on internal auditing in 1947-48.

GEORGE D. WELLS JR. has been appointed factory sales representative in Kansas and western Missouri for Caloric Stove Corp., Philadelphia. Mr. Wells is a son of The Gas Service Co.'s new business manager at Topeka.

EDGAR R. CROFTS and ROBERT E. GINNA, vice presidents of the Rochester (N.Y.) Gas & Electric Corp., have been added to the company's executive committee. All officers of the firm have been re-elected.

HARRY CAIN, district manager for Lone Star Gas Co. at Longview, Texas, has been transferred to Beaumont and promoted to assistant division manager. Other changes reported by the Dallas utility include: C. B. SEARLE from Monroe division accountant to auditor in the Louisiana-Mississippi distribution division administrative office in Shreveport; E. L. COVIN from east Texas division office manager to division office manager of the Monroe, La., division; and F. F. McMULLEN from the Houston general office to division office manager at Jacksonville, Texas.

J. E. MEANS has been named acting head of Houston (Texas) Natural Gas Co.'s air conditioning department. He succeeds L. L. LADEWIG, who has been transferred to the sales department. Mr. Means began work with the company in 1928, having served with the Southern Gas Co. of San Antonio.

GRACE C. PHARR has joined The Manufacturers Light & Heat Co., Pittsburgh, as a home service director and will make her headquarters in Uniontown, Pa. Miss Pharr received her home economics degree from West Virginia University in 1944.

E. HOLLAND, formerly director of dealer sales for the B. C. Electric Railway Co. Ltd. at Victoria, B.C., has been appointed gas sales engineer for the company at Vancouver. R. PATRICK succeeds Mr. Holland in Victoria.

RAY A. REED has been appointed by Surface Combustion Corp., Toledo, as a district salesman in the Minneapolis territory, specializing in sales and servicing of Janitrol heating equipment.

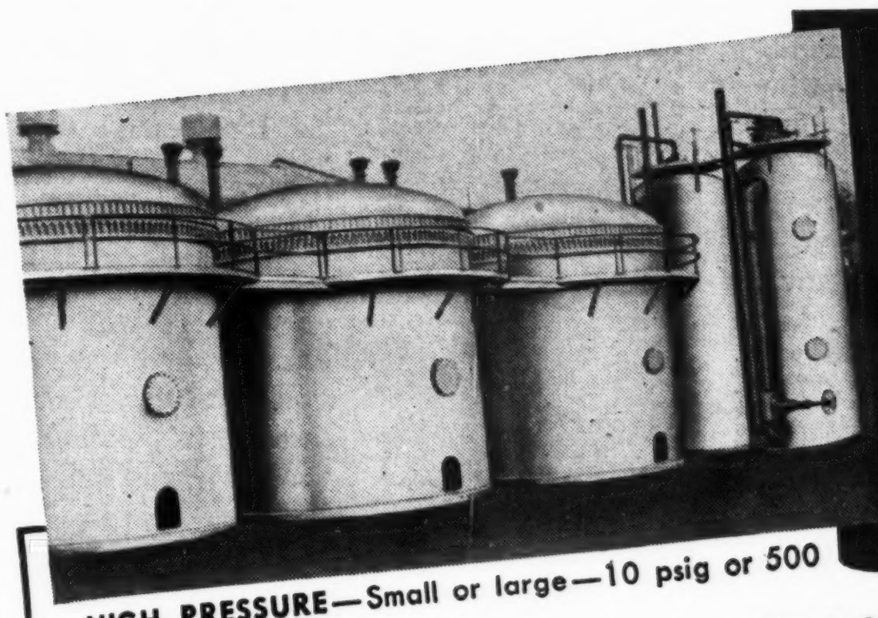
JAMES DOSS has been named director of public relations for the Citizens Gas & Coke Utility, Indianapolis, replacing B. M. SCHERER, who resigned.

- OBITUARIES -

RALPH HOOKE, 53, Middle West regional manager for the Timken Silent Automatic Division, Jackson, Mich., died June 8 in Evanston, Ill., after a short illness. Mr. Hooke joined Timkin as a district sales manager in 1931 and took over as regional manager in 1937.

HAROLD W. WICKSTROM, technical editor of *GAS'* affiliated publication, BUTANE-PROPANE *News,* since the date of its first issue in 1939, died in Los Angeles July 7 after a short illness. He was 51 years old. Mr. Wickstrom was a consulting engineer of international reputation, who had specialized in the LP-Gas industry for many years. A technical writer of great ability, he contributed many important articles to *GAS* and BUTANE-PROPANE *News.*

After studying mechanical engineering at the University of California, Mr. Wickstrom entered the field and constructed petroleum refineries, LP-Gas town and bulk plants, oil storage plants, pipelines, etc. At various times during his long career he had been connected with the Associated Oil Co., Parkhill-Wade, Southwestern Engineering Co. and Swinerton



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& Walberg Engineers Ltd. He was a member of the California Natural Gasoline Assn. and the American Society of Mechanical Engineers.

Among projects constructed under his supervision were the LP-Gas town plant at Las Vegas, Nev.; the LP-Gas standby plant at Long Beach, Calif.; a portion of the Little Big Inch pipeline; and the Naval underground fuel depot at San Pedro, Calif. One of his last projects was designing the town plant for Tijuana, Mexico, the installation of which is not yet complete, and at the time of his death he was serving as consulting engineer for the Las Vegas town plant.

Mr. Wickstrom was called to Europe twice for consultation with the Swedish government concerning plans for refineries and pipelines in that country.

T. J. Gallagher

THOMAS J. GALLAGHER, manager of the commercial sales department of The Peoples Gas Light & Coke Co., Chicago, died of a heart attack on June 14 while enroute from a convention in New Hampshire. Mr. Gallagher was 58 years old and had served with Peoples Gas since 1927, when he was appointed manager of the hotel section in the hotel and restaurant department. He organized the utility's commercial sales department in 1936 and served as its manager since that time. Mr. Gallagher was a past president of the Chicago Restaurant Purveyors Assn. and had been prominent in AGA activities.

N. W. BAHAN, one of the founders of Lone Star Gas Co., died June 18 at the age of 86. Mr. Bahan went to Corsicana, Texas, in 1904 to serve as superintendent of the Navarro Refining Co. In 1909 he moved to Fort Worth and helped to organize and secure a charter for Lone Star when it began operations in the Petrolia field. He was elected vice president and a director at that time, the position he held until his retirement in 1927.

ALBERT F. REITEMEYER, secretary-treasurer of the Perth Amboy (N.J.) Gas Light Co. since 1899, died June 16 of a heart attack. The 74-year-old gasman became associated with the New Jersey utility in 1898 as superintendent-manager-secretary.

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RECTORSEAL #2 is a positive leak preventer for threaded, gasketed or coupled connections. It retains its plastic elasticity for the life of the connection . . . never sets hard or brittle . . . RECTORSEAL #2 has two consistencies: (1) Thin, in the can for easy application and ECONOMY. (2) Thick in the connection for PERFECT sealing.

RECTORSEAL #2 is impervious to all petroleum fractions (liquid or gaseous) . . . withstands extremes of pressure and temperature. It's a positive leak preventer.

Available in pint, ½ pint or ¼ pint brush-top cans. Ask your jobber . . . if he can't supply you, write direct to

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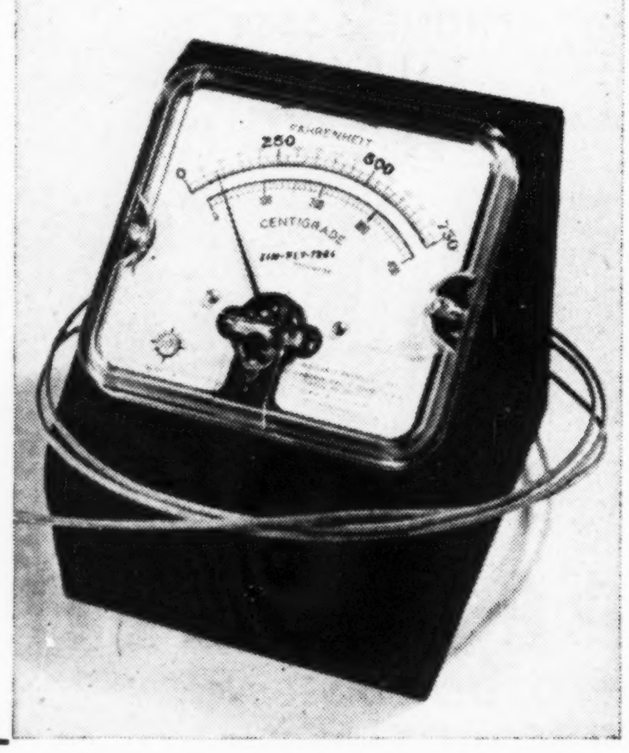

CATALOGS

NATIONAL CARBON CO. INC., Room 1328, 30 E. 42nd St., New York 17, N. Y.— A new descriptive folder, Section M-8500A, presents information on ground anodes and backfill material for use in cathodic protection and electrical grounding. Carbon and graphite ground anodes are discussed for a number of cathodic protection applications. Tables are included for determining type, size and quantity of ground anodes and amount of backfill required. Also discussed is the type BF-2 graphite backfill material which will prolong the life of an anode by transferring electrochemical attack from the anode to the backfill.

THE C. M. KEMP MANUFACTURING CO., 405 E. Oliver St., Baltimore 2, Md.— Catalog D-27, "Kemp Dryers for Air, Gases, and Liquids," features a discussion of the basic principles and specific factors affecting the dynamic drying of air, compressed air, gaseous ammonia, nitrogen, metallurgical atmospheres (heat treating), hydrogen, inert gases, natural gas, oxygen and various liquids including animal oils, butane, distillate fuel oil, freon, gasoline, vegetable oils and many others.

PITTSBURGH EQUITABLE METER DIVISION, Rockwell Manufacturing Co., 400 N. Lexington Ave., Pittsburgh, Pa.— A new bulletin, No. 1044, describing the line of Crawford pressure regulators is available. Details of construction and application are shown in sectional views. Typical performance curves are reproduced to help guide selection of size and type. Tabular specifications, prices and weights for all sizes from ¾-in. through 6-in. are included.

AMERICAN RECORDING CHART CO., 3113 E. 11th St., Los Angeles, Calif.—A new bulletin describing Arcco-Anubis liquid gravitometers is available. Explained in detail and illustrated with graphs and installation diagrams are both the standard instrument and the controlling recording liquid gravitometer for use in the petroleum, chemical and food industries. The catalog is designated 111 R.

BRYANT INDUSTRIAL DIVISION, Affiliated Gas Equipment Inc., 1020 London Road, Cleveland 10, Ohio — Catalog 292 describes and pictures 33 items of gas combustion equipment. Capacity and dimensional tables are included for combustion assemblies, gas-air and air-gas mixers, blowers and boosters, many burner types, pilot and ignition devices, controls, valves, regulators and other accessories.

SCHUTTE & KOERTING CO., Philadelphia 22, Pa. — Bulletin 18RC, "Recording and Controlling Rotameters," pictures and describes the company's line of electronic, electric and pneumatic recording and controlling rotameters. Copies of the catalog are available upon request.

THE NORTH AMERICAN MANUFACTURING CO., 4455 E. 71st St., Cleveland 5, Ohio — "Certified Combustion by North American" is the title of a 4-page bulletin which describes the Series 58 gas burner.

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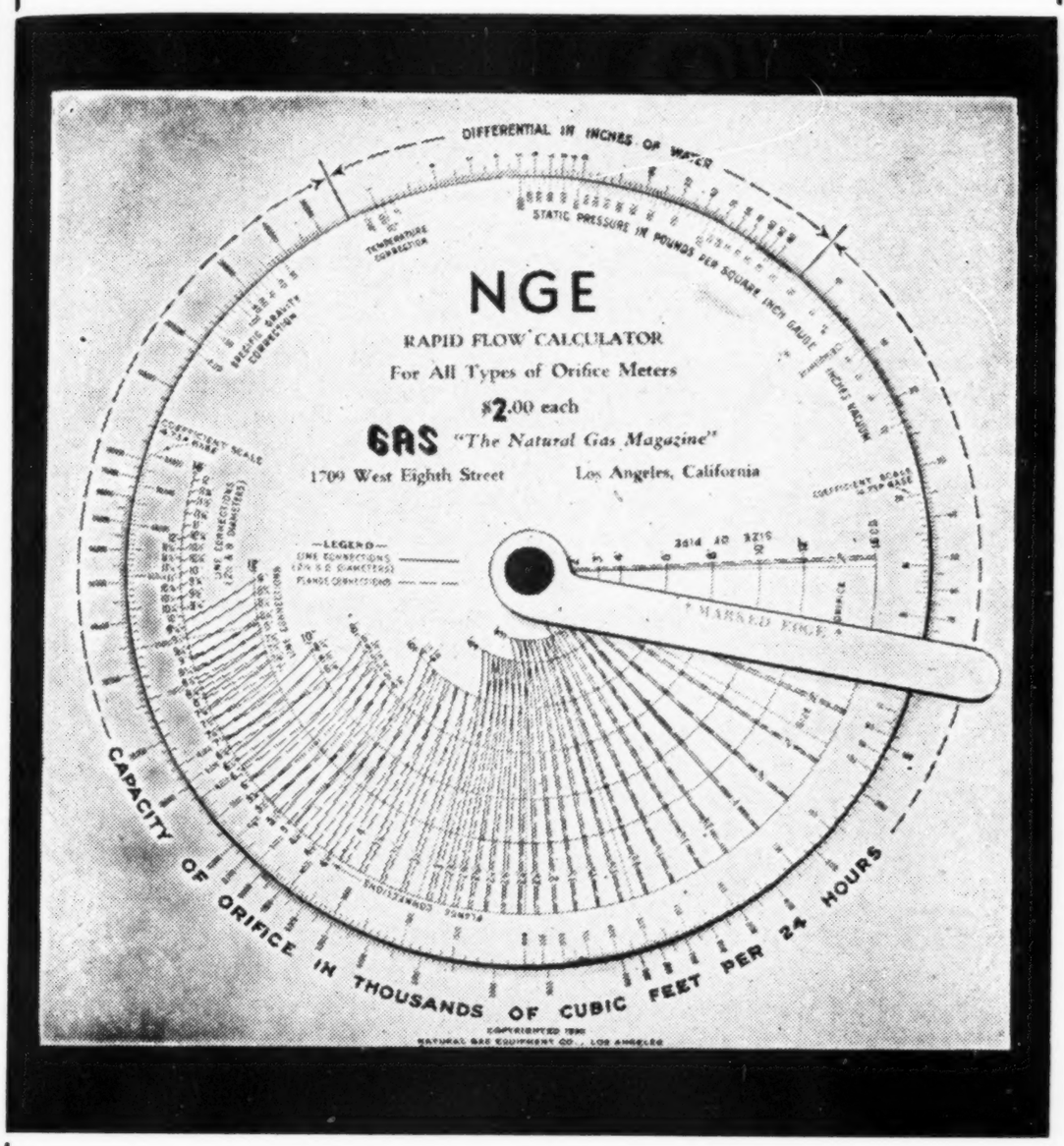
FROM 2 inches TO 16 inches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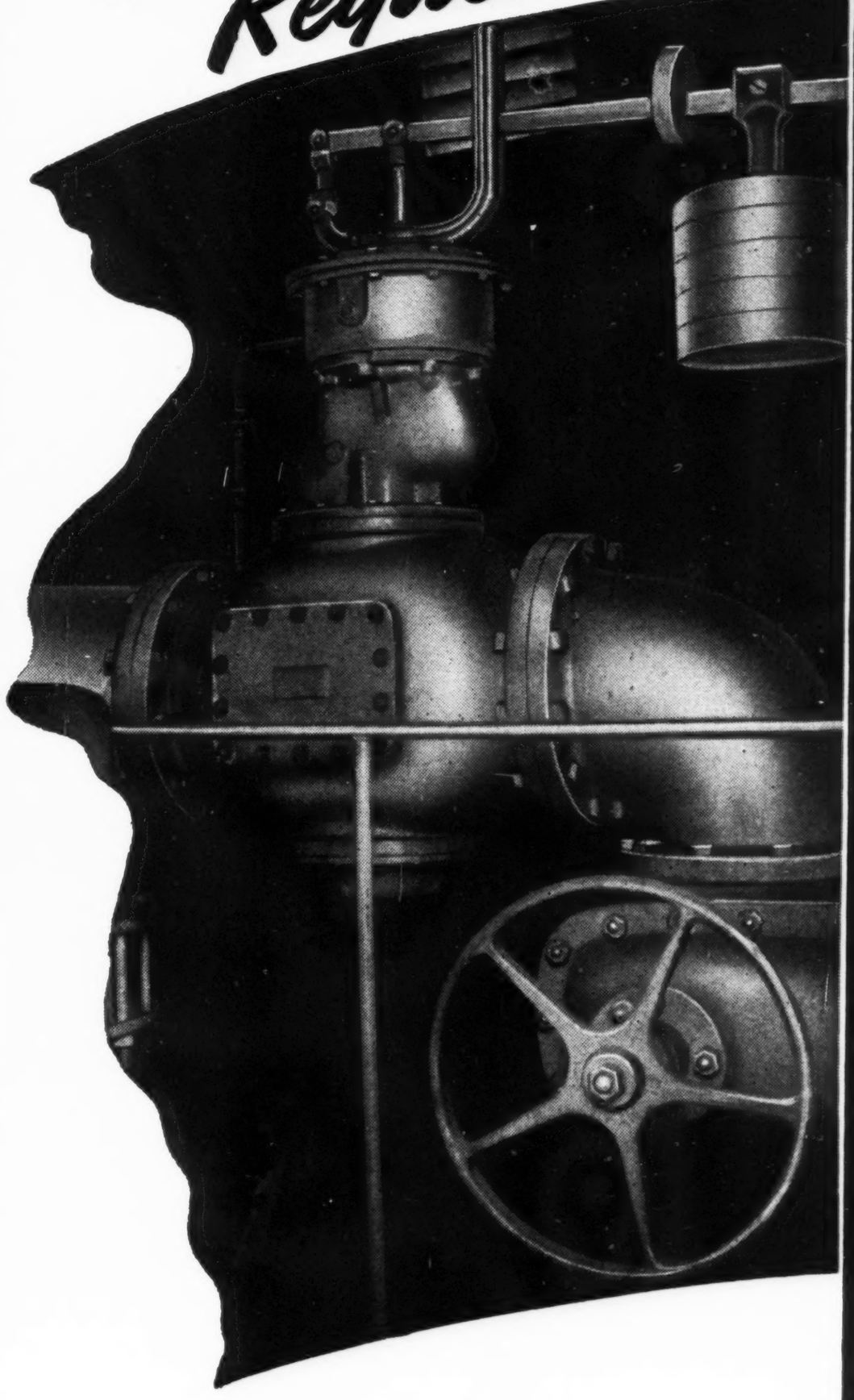
Reynolds KT Series Versatile Regulator



★ Reynolds KT Series Versatile Regulator is manufactured in a range of sizes from 2″ to 12″. It will reduce pressure to inches W. C.—or pounds to pounds. This Regulator can be used where space is limited, making it impossible to use the auxiliary bowl. In addition, Reynolds builds High Pressure Line Regulators with auxiliary bowl, when complete lockup is required. Let Reynolds adapt their new Versatile Regulator to your Gas Control System.

Reynolds GAS REGULATOR CO.
ANDERSON INDIANA U.S.A.

THE COLEMAN CO. INC., Wichita, Kan.—Catalog No. 3A discusses automatic gas floor furnaces. A description of the new "Shallo-flow," a dual wall floor furnace which is only 22¾ in. deep, is included. Other exclusive features, according to the manufacturer, are the Blu-Arch burner, 100% safety shutoff valve, and U-type gas control valve.

CRANE CO., 836 S. Michigan Ave., Chicago, Ill. — "Unit Fabrication" is the title of a new bulletin on the advantages and economies of factory unit-fabrication of welded piping headers, assemblies and valve groupings into one-piece, pre-tested units. Plant facilities are discussed; sample unit-fabrications are shown and analyzed.

SALES SLANTS

THE AGA AWARD for Gas Summer Air Conditioning will be presented at the annual AGA convention in October to the organization making the outstanding contribution to the advancement of gas air conditioning during 1948. Brochures outlining the scope of activities to be judged and setting forth regulations for entries have been mailed to all gas utility companies. The award, consisting of a copper plaque and $1000, was presented to Southern California Gas Co., Los Angeles, last year. Prizes are donated by Servel and the contest is sponsored by AGA.

OBSOLETE RANGES will be replaced with new gas models during next fall's "Old Stove Round-Up," a GAMA promotional program with a western flavor. Salesmen dressed as cowboys will be scouring the country to locate the oldest cooking appliance in use in every city and town and to replace it with a new completely equipped gas range. Gas utilities, 62 range manufacturers, and about 70,000 gas range dealers will launch the campaign. Chief objective will be to point out that homemakers should not judge gas as a fuel for cooking or gas ranges as cooking devices by the 10 to 25-year-old ranges now in use in many homes.

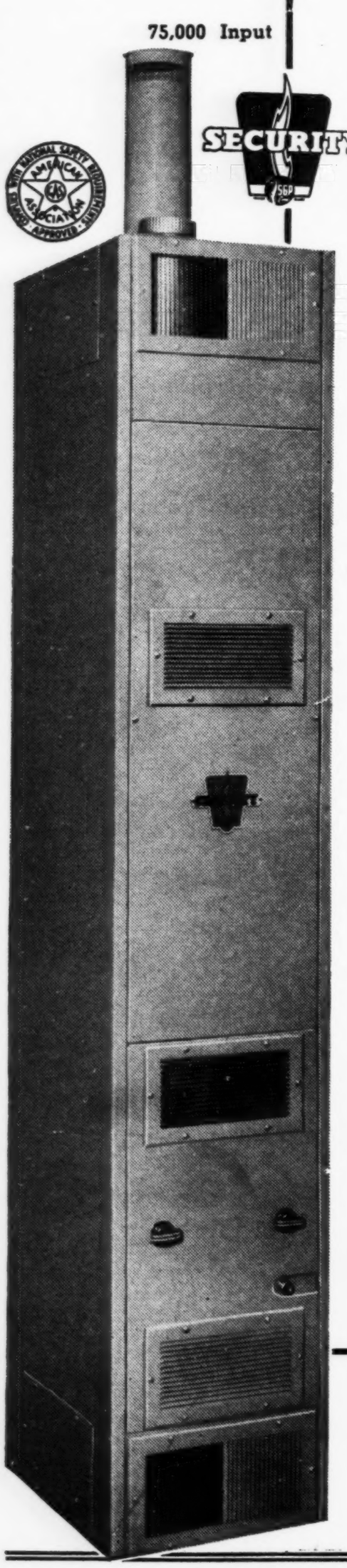
The first of eight regional meetings to launch the campaign was held at Atlanta, Ga., on Aug. 1. Carl H. Horne, Alabama Gas Corp., Birmingham, and chairman of the AGA Domestic Range committee, presided. Other regional meetings scheduled for August and September will be held in Chicago, Kansas City, Center City (Minn.), Los Angeles, Fort Worth, Boston, and New York.

EMPIRE STOVE CO., Belleville, Ill., presented its newest gas range to company representatives at the recent 1949 sales convention held in St. Louis. Eight model ranges were displayed and used in cooking demonstrations. Features of the new range include a leveling device, front connection, new type vents, an auto-like chassis, improved door springing, and a specially designed oven burner. Sixty factory representatives were present to inspect the range, as well as Empire floor furnaces and circulator heaters. Lee A. Brand, vice president of the company, introduced Miss Thrifty-Chefette, a young lady who is being featured in Empire's range advertisements.

GAMA has released a sound slide film, "More for the Money," which has been produced in the belief that correct installation will reduce the cost of automatic gas water heater service, thereby creating greater customer satisfaction and proving the merit of automatic gas water heater service against all fields of competition. The film illustrates modern installation methods, including proper allocation of the gas water heater itself with relation to fixtures or outlets, short cuts in piping through the use of tubing, minimum runs, manifolds, hot water traps, proper venting, etc. Copies of the film are available from GAMA at $17.50.

SERVEL'S household refrigeration division has developed a new vegetable freshener for the W-600-A, 6-cu ft model. The container has an aluminum lid fitted with hangars by which it is suspended under the refrigerator shelf. Channels at each side permit sliding the drawer-type container into place. H. M. Wickman, sales manager of the division, points out that the item gives a deluxe feature to the company's lowest priced model.

"APPLIANCE RETAILING Three Years After the War" is the title of a comprehensive report put out by *McCall's* magazine which states that price definitely is a sales deterrent.



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...and you can employ duct work where necessary!

YES, sir . . . here is *the* answer to heating properly small homes without basements. Security's INN-A-WALL is an entirely new principle in forced air heating! Requires minimum duct work . . . may be used without ducts. Needs only 16 by 20-inch floor area.

The INN-A-WALL reverses the usual flow pattern . . . warm air comes out the *bottom*. This means *warm floors!* Warm air can be taken from all four sides . . . return air, from all sides at the top. Where ducts are required for distant rooms, permanent connection is made at the bottom. Completely assembled . . . ready to install. Casing height, 88 inches. Security breather tube automatically supplies air for combustion.

Other outstanding INN-A-WALL values are • Quiet positive blower • Fully automatic • Special Security high-efficiency burners • Complete adaptability to any floor plan (may be placed in wall or stand alone) • Amazingly economical in price.

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WHITE-RODGERS GAS SAFETY PILOTS with PUSH BUTTON ELECTRIC IGNITION give GAS HEATING

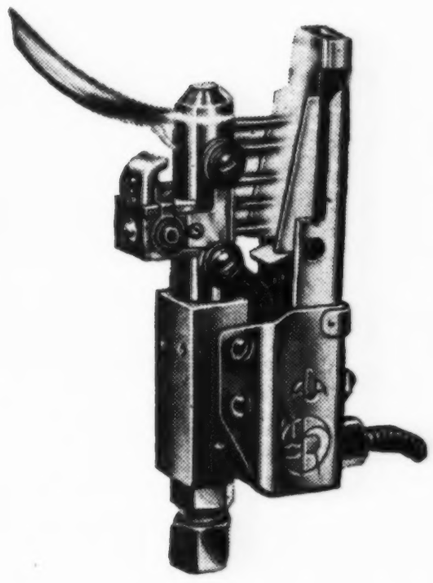
—Greater Convenience
—Automatic Recycling
—Extra Sales Appeal

Pilot ignition by merely pushing a remote-control button appeals to users of gas heating because of its safety and convenience. Utilities are relieved of the usual heating season "start up" service calls.

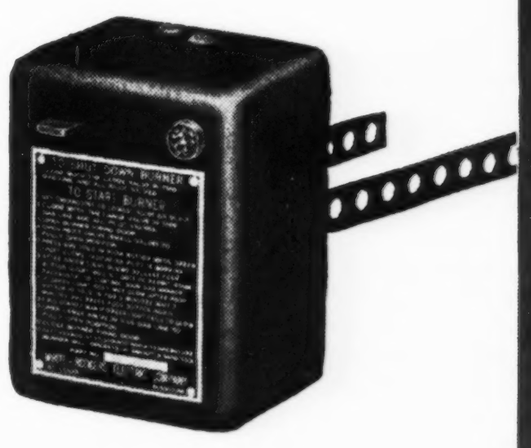
Equipment manufacturers appreciate this sales appeal and also the fact that this pilot can be mounted in the most efficient location for ignition of the main burner without regard to accessibility for hand lighting.

White-Rodgers gas safety pilots use no bi-metal or thermocouples, are fast acting, low on gas consumption and automatic recycling. Furnished with universal mounting brackets.

Write for Complete Catalog of Gas Controls.



Push-Button Electric Ignition Gas Safety Pilot



Remote Push Button Switch Box

May be mounted on pipe near main shut-off valve or any other convenient location. Current to ignition coil shuts off automatically after pilot is ignited.

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FOR REFRIGERATION · HEATING
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GOOD NEWS FOR NATURAL GAS USERS . .

CARLON "E" SYNTHETIC FLEXIBLE PIPE

Will not corrode when buried in acid or alkaline soils. It is completely free from electrolytic corrosion and cannot form a galvanic couple.

Carlon "E" Pipe has been proven by laboratory tests and miles of actual working gas lines.

Long length and light weight coils with simple fittings save up to 80% of the cost of installation.

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STREET CITY ZONE STATE

Under the heading, "Ranges," the report says that many dealers tell of prospects who are interested but will not replace their present range because of price. There is a definite shortage of models with few chrome gimmicks or special features, but which will perform the same service for less money, they believe. "We wonder," one retailer is quoted as saying, "whether manufacturers realize that before long we are not going to be able to move these highest priced numbers. We are having a hard time doing so right now." Another dealer said, "We wish that the appliance manufacturers would base their production on the fact that there is a bigger market for Chevrolets and Fords than there is for Cadillacs."

BROOKLYN UNION GAS CO., George D. Roper Corp., and Servel Inc. began participation in a television program on June 14. Telecast over New York station WJZ-TV, channel 7, three days a week, "Market Melodies" features spot announcements from a number of organizations. In addition to these spots, the home service section of BU's new business department is making a guest appearance on the program once a week. A New Freedom gas kitchen has been installed in the studio, and hundreds of recipes have been checked for demonstration purposes.

A 30-GALLON AUTOMATIC gas water heater was awarded to Charles L. McCall, of Chicago, the winner of a drawing held at the close of the recent convention of the National Assn. of Master Plumbers in Cleveland. Mr. McCall had his choice of the heaters produced by the 22 manufacturers who are sponsoring the Court of Flame contest in cooperation with GAMA. The campaign has been enthusiastically received by the plumbing trade, according to GAMA, and many plumber dealers have been among the winners.

SOUTHERN CALIFORNIA GAS CO.'s R. D. MacMahon, general supervisor, commercial sales, is shown presenting to Frank R. Brown, of the Frank R. Brown Plumbing Co., Los Angeles, a $300 U.S. Saving Bond as first prize for his region in the national Court of Flame gas water heater campaign. Mr. Brown won the bond for his automatic gas water heater sales during the first quarter of the drive. At present the Court of Flame program is in its third quarter which will end Sept. 30.

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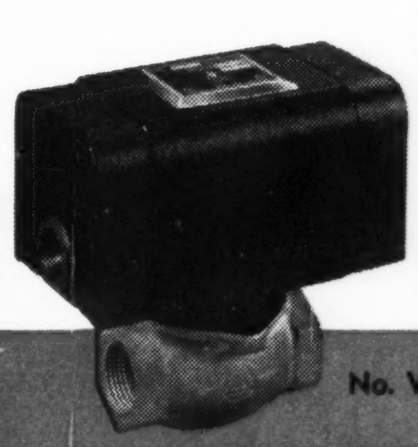
proven right

When you install DETROIT Certified Controls you are providing your customers with the best in control equipment. DETROIT Certified Controls are designed and built to fit your customer's needs—giving real economy and reliability through years of trouble-free service. This is true of the entire DETROIT line, one of the most complete in the heating field. Add to this the fact DETROIT has been famous for quality for over 70 years and you have an unbeatable combination. But DETROIT goes even further, certifying every control in its line—backing you, your work and your reputation. For helpful information on ordering and installing DETROIT Certified Controls, on oil and gas heating units, send for the colorful DETROIT Catalogs today.



No. V-570 "Bi-flex" Gas Valve—An electrically operated valve for main supply line to burner. Step-opening feature provides quiet ignition. Shut-off is positive, operation quiet. Controlled by No. 411 Thermostat for uniform room temperature. Write for Bulletin No. 201.

No. 411 Thermostat—A sensitive and accurate "timed-cycling" thermostat for all types of heating systems. Provides extremely close control of room temperature. Attractively styled, easily installed and adjusted. Write for Bulletin No. 193.

No. 411

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DETROIT HEATING AND REFRIGERATION CONTROLS • ENGINE SAFETY CONTROLS • FLOAT VALVES AND OIL BURNER EQUIPMENT • DETROIT EXPANSION VALVES AND REFRIGERATION ACCESSORIES • STATIONARY AND LOCOMOTIVE LUBRICATORS

Serving home and industry AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILER • ROSS HEATER • TONAWANDA IRON

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With the demand for gas at an all time high, Iron Sponge answers the need for rapid flow and higher pressures in gas purification. Specify Iron Sponge for extra high capacity and activity . . . longer periods between necessary recoverings . . . fast, complete come-back after fouling . . . low initial cost and low maintenance . . . minimum operator attention. These are the advantages that have made Iron Sponge the choice of the gas industry for over 73 years.

Other Connelly products include:

CALOROPTIC. A simple, inexpensive instrument for continuous direct readings and BTU control of manufactured, natural, propane and butane air gas.

H2S TESTER. For quick, accurate tests using pre-tested paper discs.

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OIL BURNER

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- **NO STEAM required for atomization or heating**
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CURRENT READING

THE EFFECT OF OXYGEN IN GAS Upon Gas Distribution Systems—by Frank P. Mueller, The Peoples Gas Light & Coke Co., Chicago. This paper was presented at the AGA Production & Chemical Conference in New York in May.

In summarizing the results of the survey it can be said at the outset that apparently the experience of various gas companies with the effect of oxygen in gas upon gas distribution systems is limited. A preponderance of "Do not know" answers was received on all of the questions. This is not surprising since the use of gas-air mixtures is relatively new and not too many field data are available.

One point upon which there seems to be rather close agreement is that water in the liquid form is generally necessary for serious internal corrosion to occur. While there are exceptions even to this condition it seems from the results of early investigators, as well as the experiences of a number of different gas companies, that whatever the deleterious effects of oxygen might be on the internal walls of gas mains they will be much more severe if liquid water is present.

THE CONTINUOUS GASIFICATION of Powdered Coal Suspensions by Air-Oxygen and Air-Oxygen-Steam Mixtures—by C. Von Fredersdorff, Institute of Gas Technology, Chicago. This paper was presented at the AGA Production & Chemical Conference in New York in May.

Suspension gasification represents one of the processes under investigation for possible future application in gas production. Its main advantages lie in that it is a single stage, continuous process that has high volumetric throughput potentialities for the processing of any type of coal. Interest in the process is growing because of the large quantities of readily available, low cost, finely divided fuels in the United States and because of recent developments in lowering the cost of oxygen.

Anticipated benefits of the process for the industry include the production of (1) a low cost base or carrier gas for blending purposes, (2) a gas of intermediate calorific value by oil carburetion of the hot exhaust of the gasification furnace and (3) a gas of adjusted H_2/CO ratio which can be used for synthesis purposes.

PIPE BATTERIES—by F. A. Hough, W. C. Mosteller, and R. O. Randall of Southern Counties Gas Co., Los Angeles. The paper, delivered at the AGA Natural Gas Dept. spring meeting at French Lick, Ind., in May, presents a study of the comparative costs of storing natural gas in conventional holders and in pipe holders and bottle holders. The summary and conclusions of the article are outlined here:

1. Pipe and bottle holders are well adapted to the following types of services:
   (a) The equation of hourly loads.
   (b) To provide standby gas for emergencies resulting from the failure of primary sources of supply.
   (c) To supply the difference between normal peak-day and extreme peak-day loads. However, the use of holders for this purpose is precarious because of the difficulty of forecasting the number of days that might occur in a series in which the load is higher than the normal peak-day load. Pipe type holders are, of course, not useful for equating seasonal loads or as a source of supply of gas for protracted extreme peak periods.
2. The installed cost of pipe and bottle holders of optimum design for standby service, together with the necessary compressor equipment, will vary from $49 per Mcf of capacity to $93 per Mcf of capacity, depending upon operating conditions and the design code used.
3. The difference between the annual costs produced by pipe holders and bottle holders is small and depends in most cases upon details of design and local conditions.
4. Under almost all operating and design conditions studied, the capital costs and the total annual cost of pipe and bottle holders are less than those costs for holders of conventional type.
5. The code under which pipe holders and bottle holders are designed has an important bearing on the cost of such holders.
6. The burying of pipe and bottle holders is in many cases a big advantage because it reduces the difficulty of obtaining the necessary building permits, and makes possible the use of higher design stresses.

POSSIBILITIES FOR DESIGNING Burners for Flexible Performance Without Readjustment on Base and Peak Load Gases—by W. B. Kirk, AGA Testing Laboratories, Cleveland. This paper was presented at the AGA Production & Chemical Conference in New York in May. The following paragraphs summarize the paper:

It may be concluded that burners can be designed which would be more flexible in operation on base and peak load gases than most contemporary burners. They would be essentially free from flashback, lifting, yellow tip, or turndown difficulties. They would not maintain a constant input rate, however, unless gas pressure adjustments were made to compensate for the type of gas served. They would have certain limitations in that they would require adequate secondary aeration, and effective protection against plugging of ports by dirt, gum, or cracked gases. Because of somewhat lower primary aeration, the potential hazard of incomplete combustion resulting from flame impingement would require careful consideration.

In attempting to adapt such burners to contemporary designs of equipment, it would be important to know their effect on speed and efficiency and the effect of the appliance itself on the burner. The burner cannot be considered without due attention to the environment in which it must operate. These possible limitations are set forth as items to be considered by manufacturers, and are not intended to discourage effort in the direction of more flexible equipment. We feel that the goal of flexible burners is not only well worth the effort necessary to attain it, but it is closer than many of us realize.

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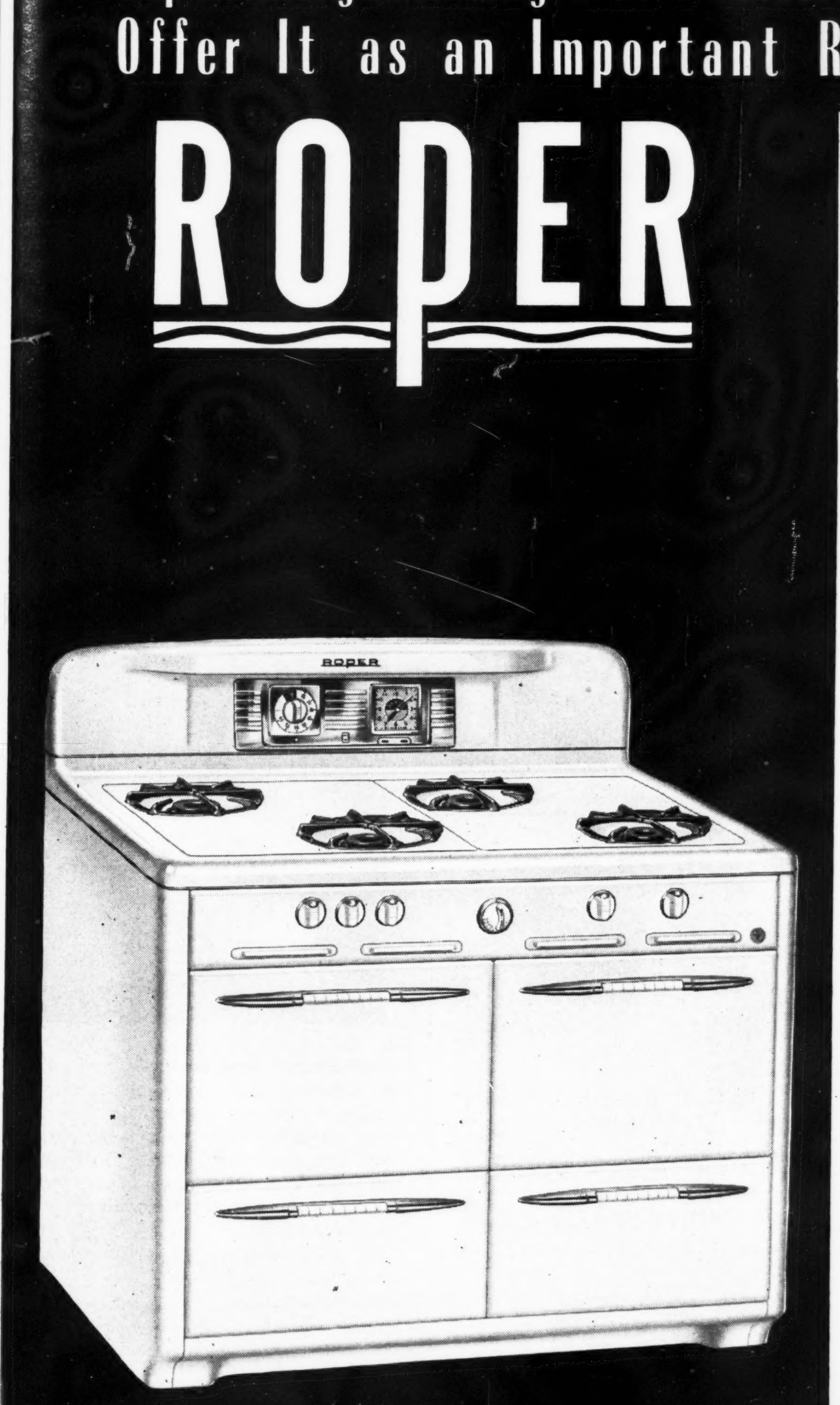

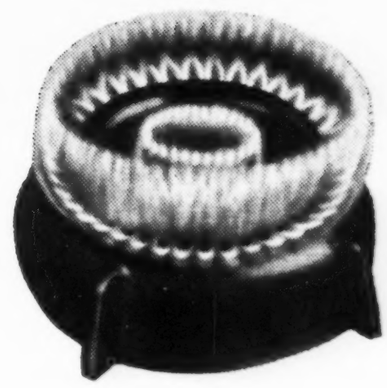

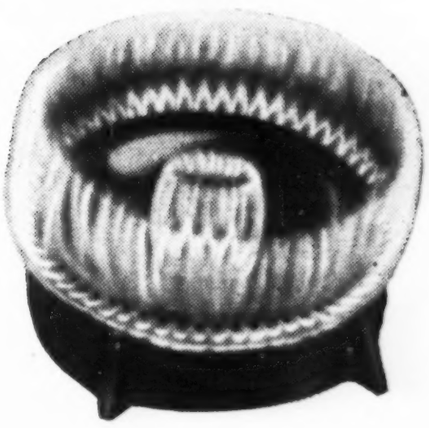

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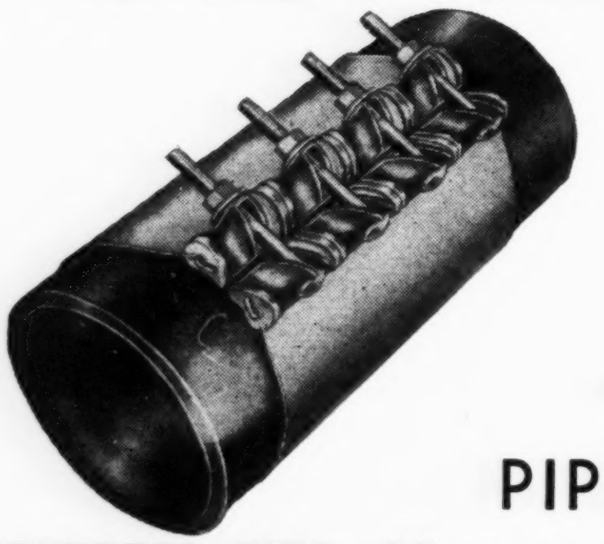

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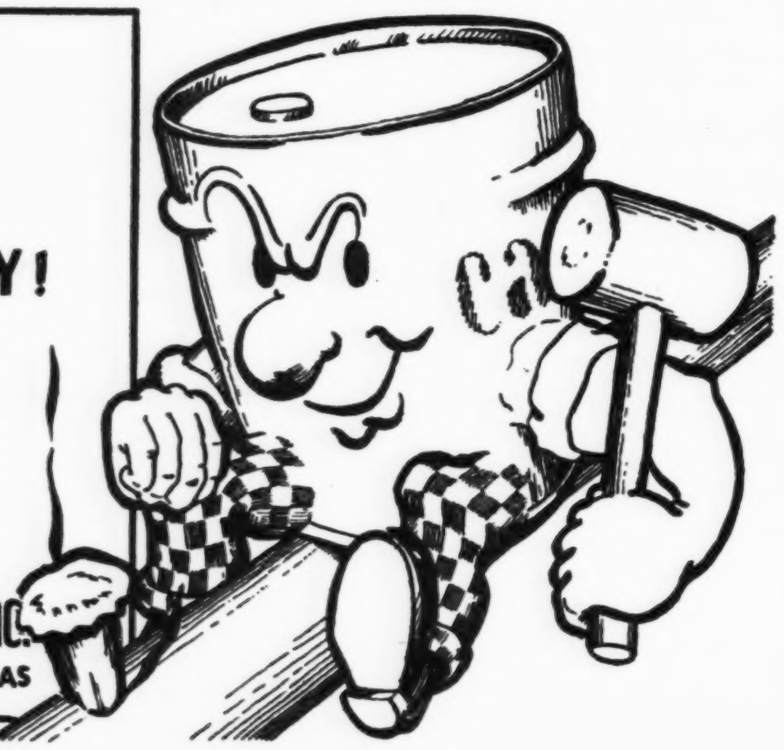


NATURAL GAS ODORIZING CO., INC.
P. O. BOX 2464 HOUSTON 1, TEXAS

NEW PRODUCTS

Domestic Range

PERFECTION STOVE CO., 7609 Platt Ave., Cleveland 4, Ohio.

MODEL: Perfection gas range.

DESCRIPTION: This company has manufactured kerosene ranges and cook stoves for many years, but this model is its first gas range. Featured is a "flavor-lock no-turn" broiler, which broils meat on both sides at the same time. Surface burners are made of stainless steel and average 11 oz each in weight. Adjustable parts, orifices and mixing chambers are fastened inside the range and do not come out with the burner. Surface burners come in three sizes—12,000, 9000, and 6500 Btu's. At the time of installation the different size burners can be placed where the housewife wants them.

Snap-out racks and rack guides may be removed easily, and seven rack positions provide

flexibility for oven cooking. The broiler can be converted to an economy bake oven by sliding a panel over the broiler burner. Both oven and broiler have high visibility "Tele-vue" windows and interior lighting with alternate automatic and manual control. There are separate automatic heat controls for oven and broiler.

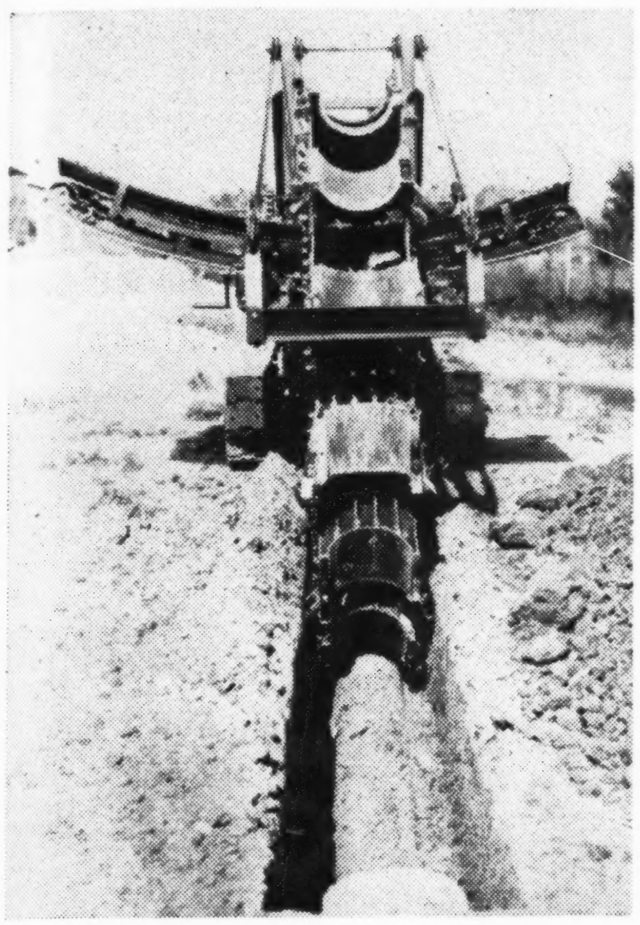
Top surface of the range measures 40 in. x 23 in. and a divided top-burner arrangement is used. Available as accessories are a "time-chimer" which signals when cooking time is up, and a lamp which illuminates the entire surface of the range.

Stripping Buckets

THE CLEVELAND TRENCHER CO., 20100 St. Clair Ave., Cleveland, Ohio.

APPLICATION: For stripping pipe for take-up and repair. They have been designed for installation on the digging wheel of Cleveland's trenching machines.

DESCRIPTION: These patented stripping buckets may be obtained in two sizes—16-in. and 22-in.—for stripping pipe from 4 to 16 in. in diameter. They permit excavating down to and along both sides of the pipe to at least



its horizontal diameter, thus completely freeing the pipe for take-up with no bending damage because of earth bind.

The contour of the buckets (see illustration) facilitates their following and staying on the line despite sidebends. Because they are nearly concentric with the pipe being exposed, all danger of tooth or rooter damage is virtually eliminated.

Reducing Valve

THE ATLAS VALVE CO., 282 South St., Newark 2, N. J.

MODEL: Type E high pressure reducing valve.

APPLICATION: For working pressures as high as 6000 psi. Recommended for reducing the pressure of water, oil and compressed air in a single state to 250 psi or to within 20% of the initial pressure. For lower reduced pressures, the reduction is to be made in two stages, the first with this Type E valve, and the second with a valve for handling working pressures up to 300 psi.

DESCRIPTION: The body of the Type E valve is forged steel. Internal metal parts are made entirely of hard chromium plated stainless steel and the one-piece seat stem and removable seat are easily reground and replaced. The plastic cup piston washers are made to suit high-pressure service. Pressure on the seat is balanced by a piston above; consequently, variations in initial pressure have little effect on the reduced pressure. A formed packing of special material superior to leather has been used. It is immune not only to water, but to oil and other fluids commonly used in hydraulic machinery.

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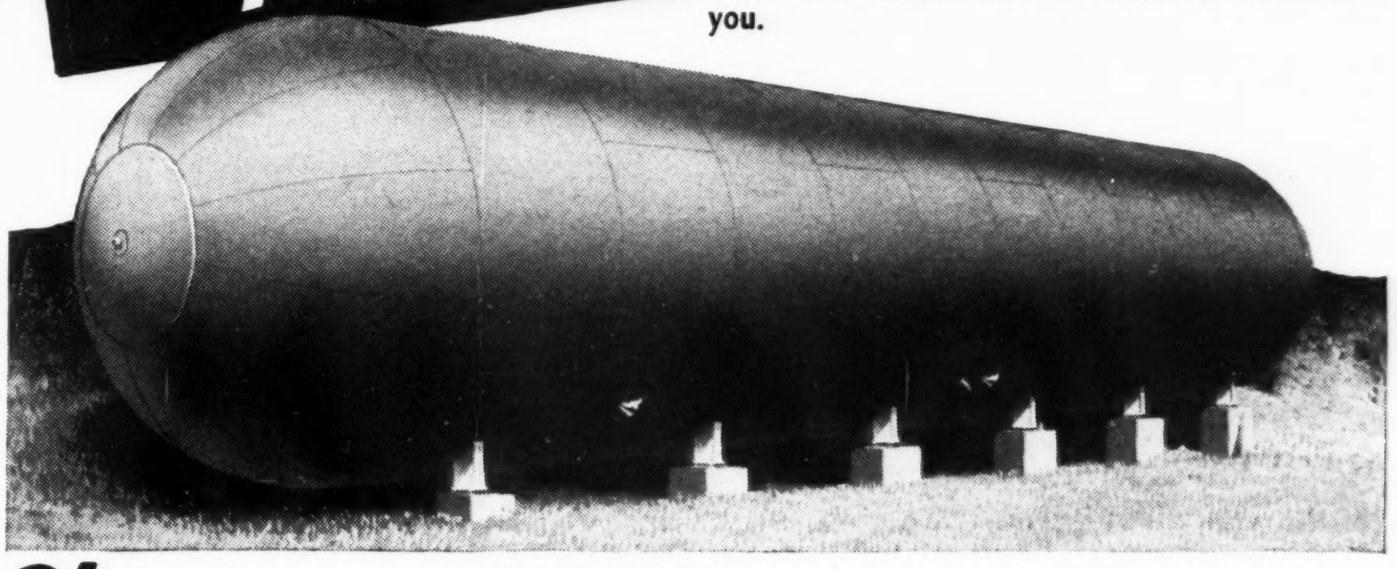

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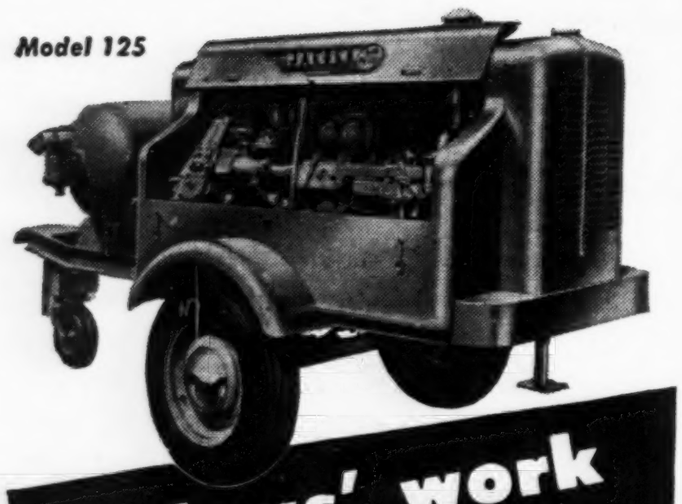
Model 125



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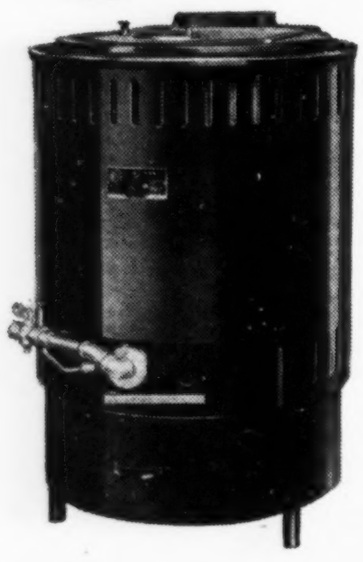

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BOWSER, INC., INCINERATION DIVISION
CAIRO, ILLINOIS

Floor Furnace

PAYNE FURNACE DIVISION, Affiliated Gas Equipment Inc., Beverly Hills, Calif.

MODEL: The Compact.

APPLICATION: Available with a flat floor grille or as a duplex register model, the furnace is offered in four sizes ranging from 30,000 to 75,000 Btu input capacity, for use with any type of gas. It can be used singly or in multiples to meet almost any heating requirement or zoned plan.

DESCRIPTION: The short under-floor depth of the Compact eliminates need for a pit and all service and cleaning operations can be performed from above the floor. The heating element is of the sectional type and is die-formed of cold rolled steel. Ribbed design provides greater strength, rigidity and absorption of expansion strains. All joints are welded, and the element is guaranteed for 10 years against rust-out or burn-out.

Permanently gas-tight flame observation windows are provided, and the pilot may be lit with the floor grille left in place. A single key manual valve controls both pilot and main burners, and automatic thermostat controls may easily be added.

The curved vane design of the Air-flow duplex wall register causes the warm air to be projected horizontally and away from the wall approximately 2 ft before curving upward. This feature counteracts the normal tendency for walls to become discolored above a floor furnace.

Other features of this AGA-approved model are heating element coated with graphite rust inhibitor, interior of duplex register assembly finished with special radiant heat-reflecting enamel, and stainless steel pilot burner.

Fire Extinguisher

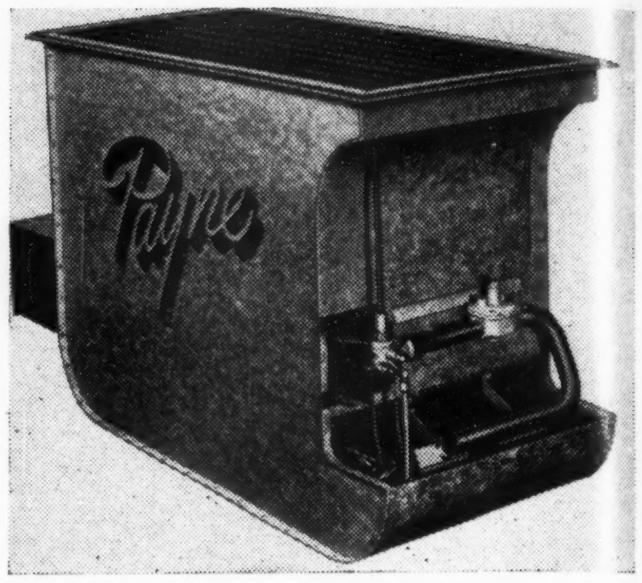
AMERICAN-LA FRANCE-FOAMITE CORP., Elmira, N. Y.

MODEL: No. 30 Alfco dry chemical hand portable extinguisher.

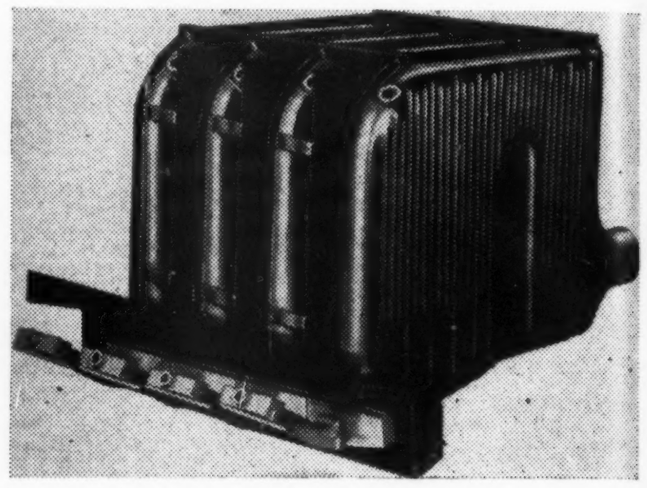
APPLICATION: Recommended for flammable liquid and electrical fires. For putting out fires in motors, busses, trucks, trailers, gasoline stations, pits, garages and all similar industrial type risks it is claimed this unit's fire extinguishing effectiveness is phenomenal.

DESCRIPTION: According to claims of the manufacturer, the No. 30 Alfco has many new outstanding advantages such as longer range, longer duration of discharge, more complete discharge of the dry chemical contents, gas-tight construction, all-internal expelling gas connections, built-in safety disc, and light weight.

The dry chemical is nontoxic, noncorrosive, a nonconductor of electricity, and will not freeze. The unit has the Underwriters' Laboratories label and is rated B-1 and C-1.



"Compact" floor furnace.



Uni-section heating element.

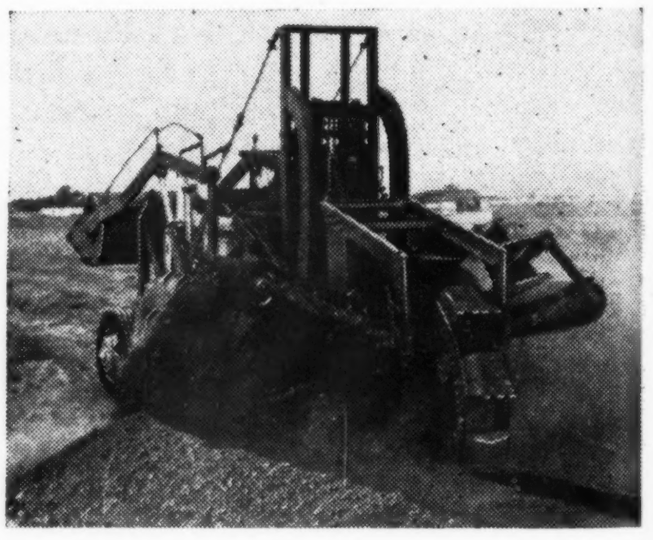
Trencher

CONSTRUCTION PRODUCTS CORP., 410 San Fernando Road, Los Angeles 31, Calif.

MODEL: Profit Trencher.

APPLICATION: For trenching quickly and inexpensively to depths of more than 48 in. and from 12 to 18 in. in width.

DESCRIPTION: This trencher, mounted on a Case tractor, has a wide range of capabilities and should prove a boon to small contractors who want to keep equipment investment to a minimum. Two companion tools increase its usefulness. With the Profit loader mounted on the front, the trencher's uses are doubled, since after trenching, the same unit can be used to load excess dirt into trucks for removal. By replacing the loader

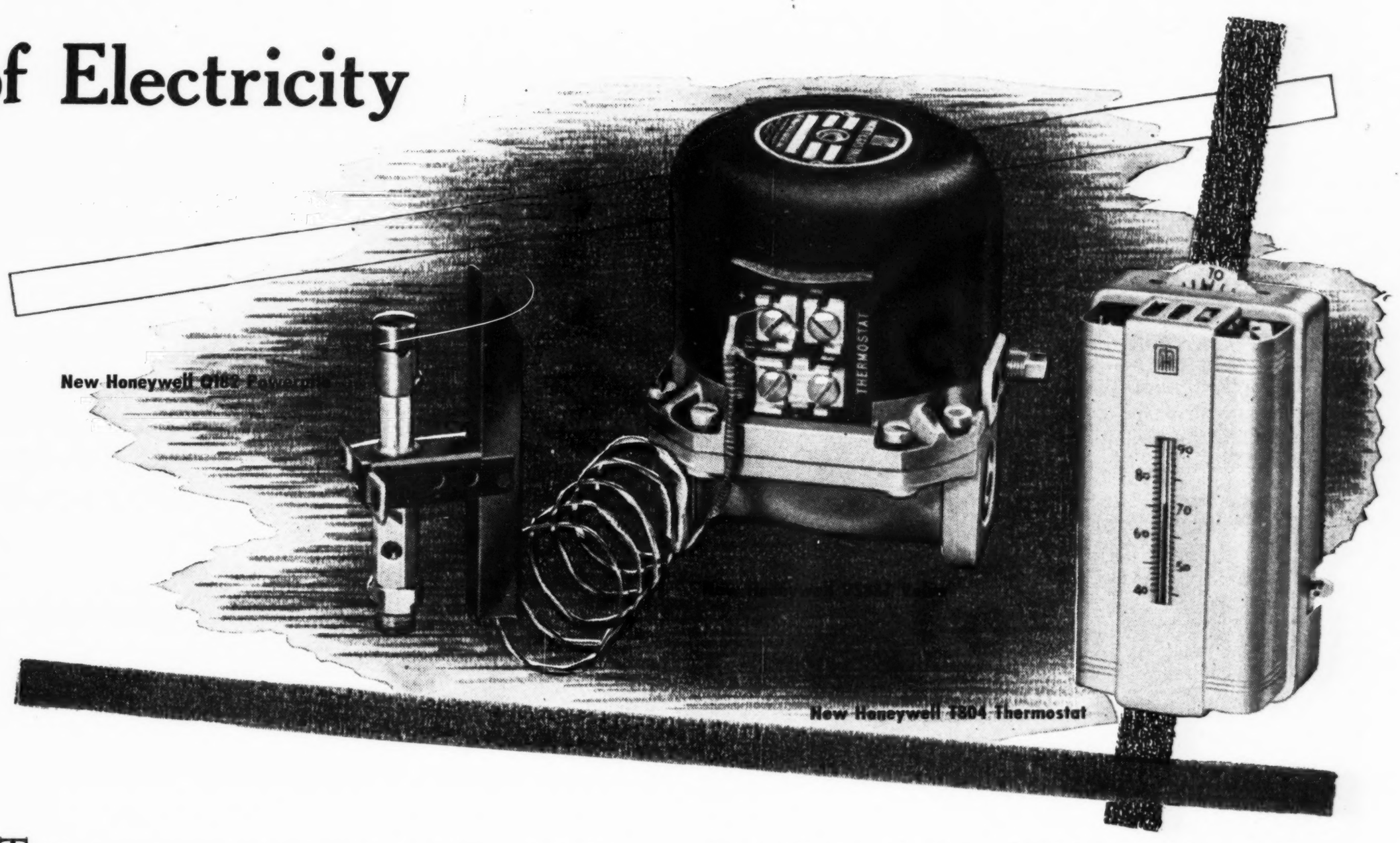


bucket with the Angle Dozer blade, the unit is capable of backfilling its own trenches.

The trencher has eight forward "creep" speeds and two wheel speeds to provide 16 forward digging combinations. Special features include wheel construction, high clearance, hydraulic lift, heavy duty chain drive, high capacity buckets, and wedge type reversible and replaceable bucket teeth. The unit operates within 30 in. of curbs, foundations, and other obstacles, and rugged construction allows minimum maintenance cost.

THE HONEYWELL POWERPILE*

New Self-Powered Gas Package Provides Fully Automatic Temperature Control . . . Requires No Outside Source of Electricity



New Honeywell Q182 Powerpile

New Honeywell T804 Thermostat

THIS new gas package set gives fully automatic heating control without using any outside source of electricity. It uses Honeywell's newly developed Q182 *Powerpile,* which generates sufficient electrical current to operate the control system. The *Powerpile* consists of multiple thermocouple elements which generate electrical energy through the temperature difference between the Powerpile tip (which is placed directly into the pilot flame), and the cooler end, which is away from the flame. Should the pilot flame fail, the control system becomes de-energized, and the gas control valve closes, thus eliminating the need for additional safety pilot.

Ingenious application of the polarized relay principle in the diaphragm actuator makes available the maximum of energy, insuring positive operation of the valve mechanism. All electrical parts are out of the gas stream, assuring long life and dependable operation.

This system features the new T804 Thermostat, designed with a special mercury switch for use on extremely low current circuits. For another industry "first", Honeywell presents a thermostat which will improve comfort by heat leveling—without using an external source of electric current.

* Trade Mark

MINNEAPOLIS **Honeywell**

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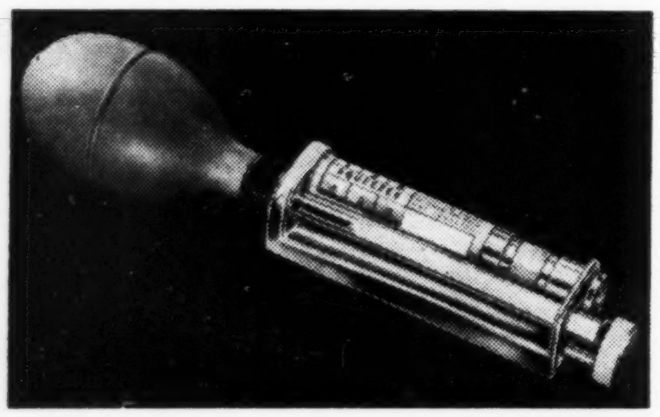
73 BRANCHES FROM COAST TO COAST WITH SUBSIDIARY COMPANIES IN: TORONTO • LONDON • STOCKHOLM • AMSTERDAM • BRUSSELS • ZURICH • MEXICO CITY

CO Tester

MINE SAFETY APPLIANCES CO., Pittsburgh 8, Pa.

MODEL: Colorimetric carbon monoxide tester.

APPLICATION: For use in public utility manholes, artificial gas plants, passenger vehicles, trucks, furnace rooms, garages, and all confined areas where fuel combustion takes place.



DESCRIPTION: This ½-lb hand instrument incorporates the most advanced developments in the colorimetric determination of carbon monoxide in the air, the manufacturer states. Indicator tubes developed by the National Bureau of Standards are used. These tubes may be stored for one year without deterioration.

If air being tested contains carbon monoxide, the yellow silica gel in the detector tube turns to a shade of green the intensity of which is directly proportional to the concentration of CO in the air sample. A revolving color scale is mounted directly beside the detector tube, and beside the various shades of green, CO concentration which they indicate are marked in percentages.

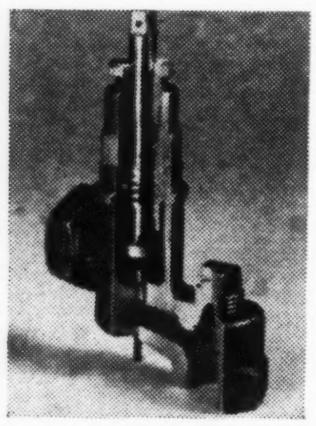
The tester is capable of indicating the presence of CO in the air from .001 to .10% by volume. No special training is necessary to operate the instrument.

Further details are contained in bulletin No. BY-2.

Service Valve

THE WELSBACH CORP., Kitson Division, 1500 Walnut St., Philadelphia 2, Pa.

MODEL: G-459 high pressure gas service valve.



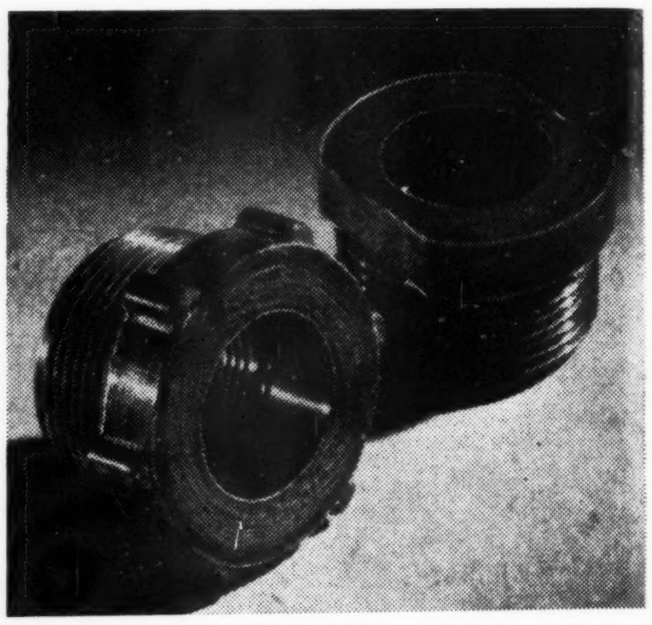
APPLICATION: Designed to cut maintenance costs on service line clean-outs, particularly on old systems where the effects of corrosion create difficult clean-out problems.

DESCRIPTION: The G-459 has been provided with a special offset feature equipped with a clean-out plug. The valve is designed for a 1 in. inlet and 1 in. outlet. With installation in an inside hookup to the service line at the basement wall, the clean-out plug may be removed and the cleaning mechanism inserted at the offset to effect cleaning of the service line.

Bushings

THE FORMICA CO. 4700 Spring Grove Ave., Cincinnati 32, Ohio.

DESCRIPTION: This new design in the company's line of electrolysis bushings offers greater ease in assembly and in tightening after assembly, according to the manufacturer. Ridges are spaced equally around the perimeter in place of the flat wrench lands previously used. These ridges permit a wrench to be applied from any angle. Mechanical thread strength is equal to that of the pipe threads. Constant dielectric strength and great dimensional stability are also claimed by the manufacturer.



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THE CLEVELAND TRENCHER CO.
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QUALITY CONTROL of the fabrication of high yield-strength pipelines

By ALEXEI P. MARADUDIN

LONG DISTANCE transportation of crude oil and natural gas has in recent years created a vast network of pipelines which deliver these products from their sources to the industrial centers of population.

During the last two decades rapid improvement has been made in the metallurgy and quality control involved in the making of steel and the fabrication of pipe. These improvements have made it possible to obtain high quality, large diameter thin wall pipe of higher strength than previously available.

The recent development of steel making and fabricating facilities in the West provided an opportunity for Pacific Coast steel fabricators to compete with the Midwestern and Eastern mills in the fabrication of large diameter, high strength, pipe. As a result, the pipe used in the construction of several lines in the last two or three years was fabricated on the Pacific Coast. This pipe was made by welding longitudinal seams with the submerged melt process. Some of the pipe was used in the "as welded" condition and some, after welding, was expanded hydrostatically to increase the physical properties.

The primary requirement was to obtain pipe of large diameter, adaptable for field welding and having a longitudinal joint efficiency sufficient to develop the minimum ultimate strength of the pipe. The pipe was required to develop a minimum yield strength of 40,000 psi and a minimum ultimate strength of 68,000 psi in the "as welded" condition, and a minimum yield strength of 52,000 psi and a minimum ultimate strength of 72,000 psi after expansion.

As these pipelines were scheduled for uninterrupted service at relatively high stresses, it was considered of the utmost importance that the fabrication and installation of the pipe be rigidly controlled to obtain welds of the highest quality.

This article primarily deals with the quality control exercised during the fabrication of the pipe at several Pacific Coast plants and during its installation in the field.

1. Steel for Pipe

THE basic requirement of good pipe is the quality of steel used and considerable care was taken by both the fabricators and the purchasers to obtain a steel that was easily welded and after being fabricated into pipe and/or expanded would have the required physical properties. A typical analysis to which the steel was ordered is as follows:

Carbon	0.20 to 0.30%
Manganese	0.95 to 1.25%
Phosphorus	0.04% Maximum
Sulphur	0.05% Maximum

In many instances ladle and check analyses were made on each heat of steel before the plates were shipped from the mill. In the majority of cases when the plates were received at the fabricator's plant, one tensile test specimen taken in a direction transverse to rolling was cut from the end of one plate from each heat of steel and tested for physical properties. If the test results were satisfactory, the plates of this particular heat were accepted for the fabrication of the pipe.

2. Plant Inspection

The routine test used in quality control of the physical properties of the pipe was to cut a 4-in. wide test ring from one length of pipe to each heat of steel, make tests and if the results of the tests were satisfactory, all pipe made from the heat would be considered acceptable. There were as many as 100 pieces of pipe to each heat of steel.

An important operation in the fabrication of the pipe was the welding of the longitudinal seam, which required a very close check. The standard API flattening test, which is to flatten a ring $2\frac{1}{2}$ in. minimum to $\frac{2}{3}$ of the diameter in width, was discarded because it is rather cumbersome and of doubtful value on pipe of this size. It was found that the large diameter of the pipe prevented sufficient stresses from developing in the weld. As a substitute, a guided face bend, guided root bend, and a nick break test were made on each ring. These tests proved to be very satisfactory in showing the quality and ductility of the weld. The nick break test was of particular value.

In order to determine whether or not the welds complied with the specification requirements tensile tests across the weld were made both with the reinforcement on and with the reinforcement machined flush with the pipe. In all cases the tests met the specification requirements.

Tensile tests also were made on the expanded pipe away from the weld. The results of the circumferential tests showed an increase in the yield strength of approximately 30% and an increase in the ultimate strength of approximately 5%. The increase in the yield and ultimate strength brought about a corresponding reduction in average elongation from the average 35% to 30% in two inches. The effect of the cold work on the longitudinal specimens was considerably lower than that on the circumferential specimens.

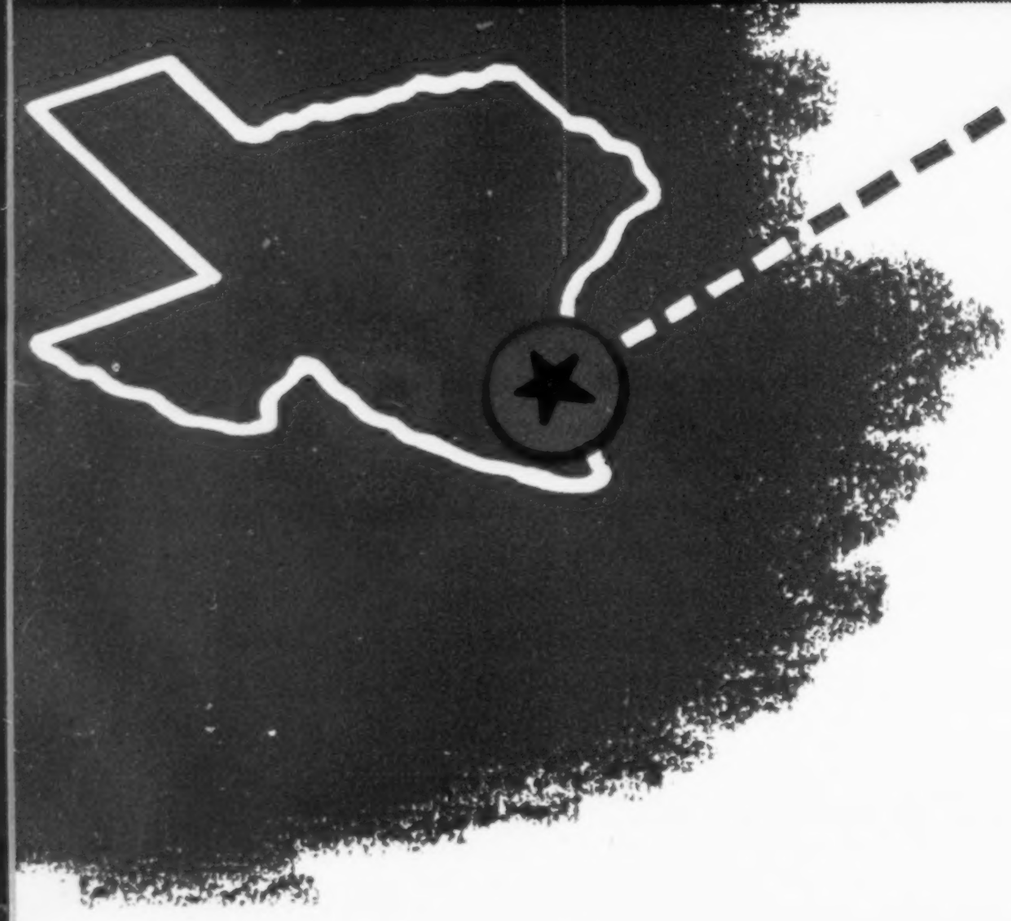
In order to check the quality of the welds many coupons were cut across the weld and specimens prepared for macroscopic and microscopic examination. An effort was made to determine whether or not underbead cracks were present in the heat affected zone; however, in all tests none were found.

In addition to the above mentioned tests, other tests were made such as hardness tests of the weld metal and the heat-affected zones, Charpy impact strength tests in the weld and in the heat-affected zone, and tension impact tests on the "as welded" and expanded pipe; also effective yield strength tests were made on the expanded pipe using resistance strain gauges and brittle lacquer. Some of the longitudinal welds were also X-rayed and Magnafluxed.

Of all the above tests probably the most conclusive was the effective yield strength test. This test, after the determination of the yield strength, was

Mr. Maradudin, materials engineer for Standard Oil Co. of California, presented this paper before the AGA Natural Gas Dept. spring meeting, May 9-10, French Lick, Ind.

GAS COOLING *from*



Pictured above is Station No. 3, The John P. Bristow Station at Fostoria, Texas on the Tennessee Gas System.

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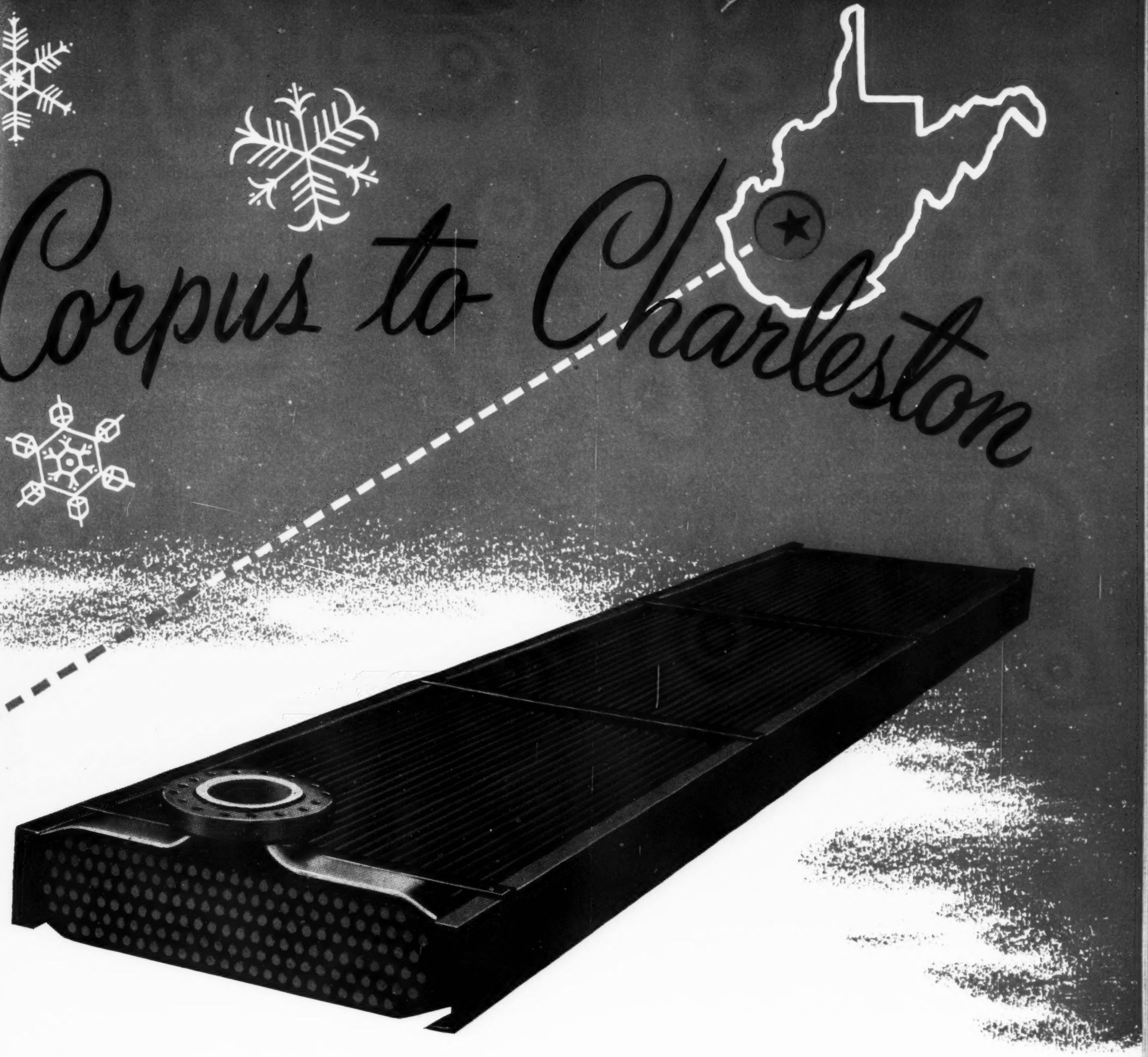

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carried to destruction. Of several lengths of pipe tested in this manner, some failed in the plate, and some in the heat-affected zone of the longitudinal weld. The calculated rupture stresses in all tests were considerably above the required 72,000 psi minimum ultimate strength of the pipe.

The final inspection of the pipe was made by qualified pipe inspectors. These inspectors had to be trained to observe defects in the weld as well as on the outside and inside surfaces of the pipe.

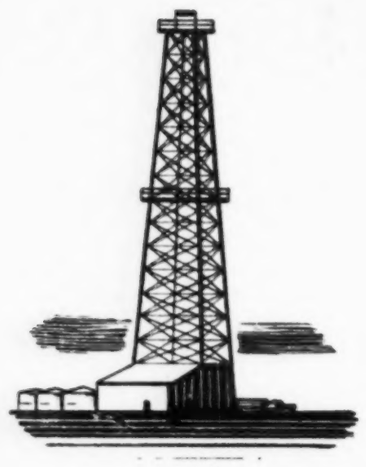
3. Inspecting Field Welds

The requirement for the field weld was to develop a strength across the weld equal to the minimum ultimate strength of the pipe. All field welding was done manually by the electric arc process using E-6010 electrodes. All welds were made in position requiring three or four passes to complete.

In order to achieve the best results tests were made to determine the type of electrode to be used. All welders employed on the pipeline were given a qualifying test, consisting of making welds in the downhand, vertical, and overhead positions. One tensile test, one guided root bend and one nick break test were made and a welder was accepted only if he passed all of the tests. The combination of X-ray or gamma ray inspection together with bend tests was occasionally substituted for the above tests with good results. It was felt that good visual inspection could do a great deal to eliminate serious defects in welds; therefore, special welding inspectors assigned to the job were trained to observe the quality of the work and to assure that the specifications were being met. In addition to the visual inspection the quality of welds was checked by gamma ray radiography. Usually 10% to 15% of all welds were tested in this manner. At least one weld of each welder was checked every day.

The interpretation of the gamma ray negatives always presents a problem. It is believed that the existing radiograph standards used for pressure vessels, boilers and similar structures are more exacting than required for pipeline work. Therefore, it was necessary to determine the effect of various weld defects on the joint strength and set up a control to be used by those interpreting the radiographs.

The first such standard was prepared by the Standard Oil Co. of California during the construction of the 18-in. O.D. Kettleman-Los Medanos pipeline in California in 1946. This standard covered the effect of all common defects and their allowable extent in the welds.



I believe it will be of interest to discuss a typical specification dealing with the quality control. Welding of 30-in. pipe is taken as an example.

4. Specifications

The contractor shall thoroughly remove all dirt, rust, scale, paint, oil, slag, and other foreign matter from the ends of the pipe immediately before aligning the lengths for welding. The joints must be aligned so that there will be a uniform space between the ends of not less than 1/16 in. and not more than 1/8 in. An internal line-up clamp must be used to assure proper alignment of the pipe during the entire time of welding the first pass (stringer bead). The pipe walls must be aligned to within 1/16 in. Preheating of the ends of the pipe immediately before welding will be required if the temperature of the pipe is below 40°F. The preheating temperature shall not be more than 400°F. Tempilstiks shall be used to determine the proper temperature.

During the welding of the stringer bead, the pipe shall not be moved until 80% of the circumference has been completed. All welding shall be done by the electric arc welding process using electrodes meeting American Welding Society Specification E-6010. The stringer bead shall be made with 5/32-in. electrodes, while the remaining beads shall be made with 3/16-in. electrodes. Tack welding shall not be permitted and striking the arc on the pipe at any point other than the welding groove shall not be permitted. Any arc spots made on the pipe other than in the welding groove shall be chipped out and repaired. Each bead shall be thoroughly cleaned of all scale and slag and all defects in welds shall be repaired prior to the application of the next succeeding bead. The final bead shall be cleaned for inspection.

(Standards of quality for the job appear below.)

5. Repair of Welds

At the conclusion of the visual inspection or upon completion of the in-

Standards of Quality of Welding

These standards shall be applied to the results of visual, gamma-ray and physical tests to determine the acceptability of the weld. Any weld that fails to meet these standards will not be acceptable. Unacceptable welds may be repaired provided that the total length of repairs of a weld does not exceed 15 in. Welds requiring more than 15 in. of repair shall be completely cut out and rewelded.

GAMMA-RAY STANDARD

A. DEFINITION OF TERMS

Weld. The term weld as used in the above standard shall mean a complete circumferential weld joining two 30-in. diameter pipe sections except when modified to limit its use to a definite portion or section of a completed weld.

Measurements. Length of defects is measured along the axis of the welding. Width of defects is measured at right angles to the axis of the weld.

Burned Through Areas. A burned through area is a portion of the weld which has been completely burned through because of the lack of the operator's control of the electrode. The result on the inside surface of the pipe is a combination of shrinkage craters, irregular holes or depressions, icicles, and a ragged, rough and irregular surface. The smooth and uniform surface of a first bead that has penetrated through the pipe to form a heavy internal reinforcement is not to be confused with the rough and irregular surface of a burned through area even though the heavy reinforcement of the first bead may be intermittent.

Lack of Penetration at the Root of the Groove. This may be either where the weld deposit has failed to fill the bottom of the groove, or else where the bottom of the groove may be filled but this weld is not fused to the pipe. The requirement for complete penetration is that the welding groove be completely filled and its edges properly fused. A weld with complete penetration may or may not have excess metal on the inside of the pipe.

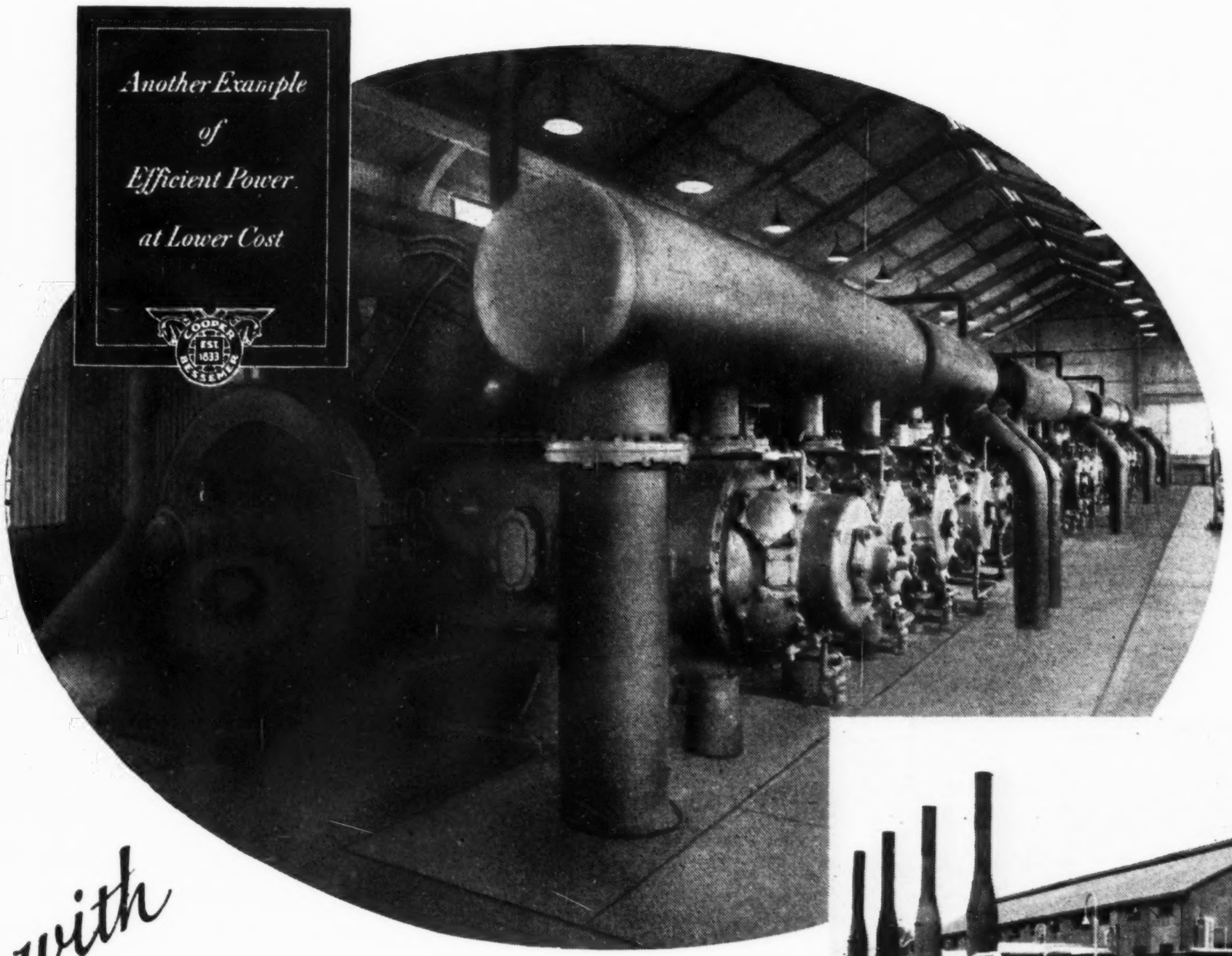
Undercuts. Undercuts are grooves along the edges of a weld deposit formed during welding by melting away metal with the arc. Undercuts will normally occur on the outside of the pipe along the edges of the cover pass; however, internal undercuts may be formed on the inside of the pipe even with all welding being done from the outside.

Elongated Slag Inclusions. Elongated slag inclusions are elongated slag-filled voids in the weld deposit.

Individual slag inclusions. Individual slag inclusions are irregular shaped isolated slag filled cavities in the weld deposit.

(Continued on p. 83)

New Delhi plant makes the most OF COMPRESSOR POWER



Automatically controlled at this new plant in the Delhi field, these four Cooper-Bessemer 1000 hp GMVs each have 5 compressor cylinders for 3-stage compression from 10 inches vacuum to 550 psi. Plant is now processing some 14 million cu. ft. of gas daily from 350 wells.

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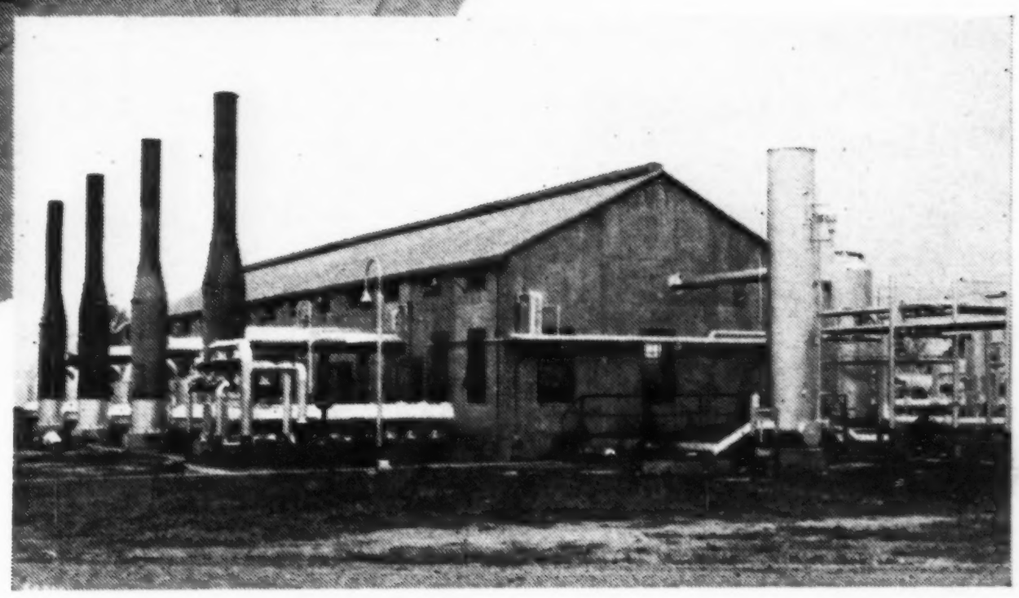

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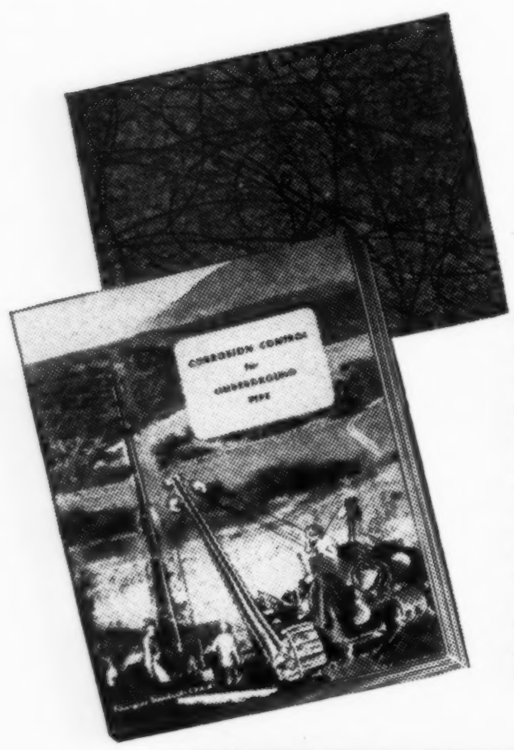

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Standards of Quality of Welding (cont'd)

B. STANDARD OF ACCEPTABILITY

Weld with Burned-Through Areas.

1. Any burned through area shall not exceed 2 in. in length and any crater shall not be longer than 3/4 in. in length.

2. Within any successive 12-in. length of weld the total length of burned-through areas shall not exceed 2 in. The total length of burned-through area in any two successive feet of weld shall not exceed 3 in. provided that the individual defects are separated by at least 4 in. of sound material.

3. No weld shall contain more than 6 in. of burned-through areas.

Weld with Lack of Penetration at the Root of the Groove

1. Any individual lack of penetration of the weld shall not exceed 1 in. in length.

2. Within any successive 12-in. length of weld the total length of lack of penetration shall not exceed 1 in. The total length of lack of penetration shall not exceed 2 in. in any successive 2 ft of weld provided that the individual defects are separated by at least 5 in. of sound weld material.

3. No weld shall contain more than 4 in. of lack of penetration.

Weld with Undercuts

1. Undercuts made by the final bead on the outside of the pipe which exceed 1/32 in. in depth shall be repaired.

Weld with Elongated Slag Inclusions

1. Any individual elongated slag inclusion of the weld shall not exceed 2 in. in length or 1/16 in. in width.

2. Within any successive 12-in. length of weld the total length of elongated slag inclusions shall not exceed 2 in. The total length of elongated slag inclusions shall not exceed 4 in. in any successive 2 ft of weld provided that individual defects are separated by at least 2 in. of sound weld material.

3. No weld shall contain more than 6 in. of elongated slag inclusions.

Weld with Individual Slag Inclusions

1. The maximum dimension of any individual slag inclusion shall not exceed 1/4 in.

2. Within any successive 12-in. length of weld the total length of individual slag inclusions shall not exceed 1 in. nor shall there be more than 3 individual slag inclusions with a maximum dimension between 3/16 in. and 1/4 in. In any successive 2 ft of weld the total length of individual slag inclusions shall not exceed 2 in., or the total number of slag inclusions with a maximum dimension of 3/16 in. to 1/4 in. may be six, provided that individual slag inclusions with a maximum of 3/16 in. to 1/4 in. are separated by at least 2 in. of sound weld material.

3. No weld shall contain more than 9 individual slag inclusions with a maximum dimension of 3/16 in. to 1/4 in. or more than a total length of 4 in. of individual slag inclusions.

Weld with Misalignment of Pipe

1. The general alignment of pipe ends or the misalignment at dents or damaged areas shall not exceed 1/16 in.

Weld with Cracks

1. No weld with cracks, regardless of their length or location, shall be acceptable.

Weld Reinforcements

1. The weld reinforcement shall be from 1/32 in. to 1/16 in. and shall be uniformly deposited over the welding groove.

2. No weld having a weld reinforcement less than 1/32 in. for a length greater than 2 in. shall be acceptable.

C. GENERAL

1. Within any 12-in. length of weld, the total length of any combination of defects each of which does not exceed its individual limit given above shall not exceed 1/2 of the combined limiting length of the defects included.

PHYSICAL TEST STANDARD

A. TENSILE TESTS

1. Tensile specimens taken across the weld with the weld reinforcement in place shall have an ultimate strength of not less than 72,000 psi.

B. BEND TESTS

1. Test coupons taken across the weld with the reinforcement removed shall be bent around a 3/4-in. radius pin with the stringer bead on the outside of the bend to an angle of 90° without evidence of fracture.

C. NICK BREAK TESTS

1. Specimens broken through the weld shall show no visible defects that are in excess of those allowable under this standard of acceptability.

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terpretation of the gamma ray of X-ray inspection the contractor shall, with the specific approval of the company inspector, make repairs to welds not meeting the "Standards of Quality of Welding" in these specifications.

Repairs made be made either from the inside or outside of the pipe, whichever method is more applicable.

Defects will be removed and the pipe prepared for rewelding by chipping or by torch gouging. If the pipe is chipped, the bead will first be chipped flush with the pipe wall, then the defect will be completely removed by chipping with a sharp round-nosed tool, the radius of the chipping edge not to exceed 3/16 in. All chipping tools must be maintained in the best of condition and the work will be performed only by fully qualified workmen.

Immediately prior to rewelding any cut-out defect, the pipe will be preheated to at least 200°F but not in excess of 400°F. Tempilstiks shall be used to determine the proper preheating temperature. All repair welding shall be done with an E-6010 or E-7010 electrode not exceeding 5/32 in. in diameter and with a minimum of two passes.

The contacts of the final bead of repair welds with the pipe wall or old weld material must be smooth and free of any abrupt change in contour.

6. Conclusions

The quality control of modern high pressure pipelines is a large and complicated undertaking and every effort possible should be made to secure a finished pipeline of the highest quality. The workability of the standards as outlined above has been definitely established. With proper selection of welders, strict supervision, dependable gamma-ray inspection, and cooperation of all concerned with the quality of the welds only a very few rejections may be expected in any pipeline welded under similar conditions.

No mention was made in this discussion of the mechanics of the gamma-ray inspection. It was felt that the subject is well covered in the literature. However, it is believed that some changes can be made to make the process faster and more economical. Review of gamma-radiographs of some of the pipelines indicated that by far the greatest majority of the repairable defects were found in the lower half of circumferential welds. In view of these findings it may be desirable to confine the gamma-ray inspection to the lower halves of the welds, thus reducing the expense without impairing the quality of the inspection.

Recently welds in two pipelines were inspected with good results—one with X-ray and another with gamma-ray from the outside. The former was 10 in. in diameter while the latter was 16 in. and 18 in. in diameter. The technique used for inspection of these lines may be too slow for larger sizes of the pipe. However, it is believed that the development of the technique and its possible application in large size pipe may offer even further reduction in the cost of the inspection by eliminating rather costly operations in drilling and repairing holes through which radium capsules are introduced inside the pipe.

THE POOR LAND AGENT

He must be a keen psychologist and diplomat to deal successfully with landowners in obtaining rights-of-way.

By BASIL J. WHITLEY

WHEN the engineering parties are sent out to survey and stake the route for a pipeline, they usually have the advantage of a route selected by an aerial survey. Land men accompany the engineering parties, and one of their assignments is to obtain permission from the landowners for surveying. In this initial contact, it is of prime importance that a friendly relationship be established and that the groundwork be laid for eventual successful negotiation of the right-of-way agreement. The land men should ascertain who owns the land to be crossed and whether or not cash lessees, tenants or share-croppers are involved, who are to be considered in the transaction, as their written permission must be obtained. The ownership of the lands is determined by abstractors or attorneys who submit title statements on each tract. All of these procedures are routine and are not classified as problems. They may differ somewhat according to the policies of various companies.

For convenience in speaking of right-of-way problems, reference will be made only to "the landowner," assuming the cash lessees', tenants' or share-croppers' legal rights are being included.

Mr. Whitley, Tennessee Gas Transmission Co., Houston, presented this paper at the Southern Gas Assn. convention, Biloxi, Miss., April 20-22.

Objections

The first reaction of the landowner is to object to the pipeline crossing his land. People, as a rule, resist change. The typical landowner will immediately build up a defensive armor, using every possible argument and objection to the crossing of his land. The land agent becomes accustomed to patiently listening to all of them, and occasionally, to hearing even a *new* objection raised. If the agent is in a position to contract with the landowner for a farm-tap whereby he is to be benefitted by the building of pipeline, then he is somewhat disarmed. If the land agent is not in this position, the only benefit the landowner recognizes is the amount of compensation he is to receive in dollars and cents. He will want to know the basis of payment, as well as the approximate consideration in cash he is to receive.

It is not wise to discuss the amount of money the landowner may expect to receive during this first conversation seeking permission to survey. His reaction is that it is not nearly enough and that he does not want a pipeline on his property. If in construction of the pipeline, cash is to be his only profit, he is attempting to support a substantial return. At this point the survey permit has not yet been obtained, and if basis of payment is discussed, the difficulties in obtaining his consent to survey have been materially increased by presenting him with something tangible upon which he can base his refusal, namely, the cash consideration for the easement. It is far better to state simply that an attempt at the time is being made to locate the route for the pipeline, and when this phase of the work has been complete and it can be pointed out definitely where the line will cross the land, the company will be in better position to present the right-of-way agreement, its terms, and the consideration.

This latter approach usually results in permission to survey across his land and does not rob the landowner of the secure feeling that he is still in a good trading position. He realizes that deferring negotiations pertaining to the right-of-way agreement will give him an opportunity to talk to his neighbors regarding their reactions to the pipeline. He likes to have the benefit of community gossip and to know what Mr. So and So is going to do about it, or if there will be any type of group action or "front" formed, to dictate terms and prices. Much conversation across the fence, at the cross-road store, and along the country roads as neighbors meet, amounts to the forming of

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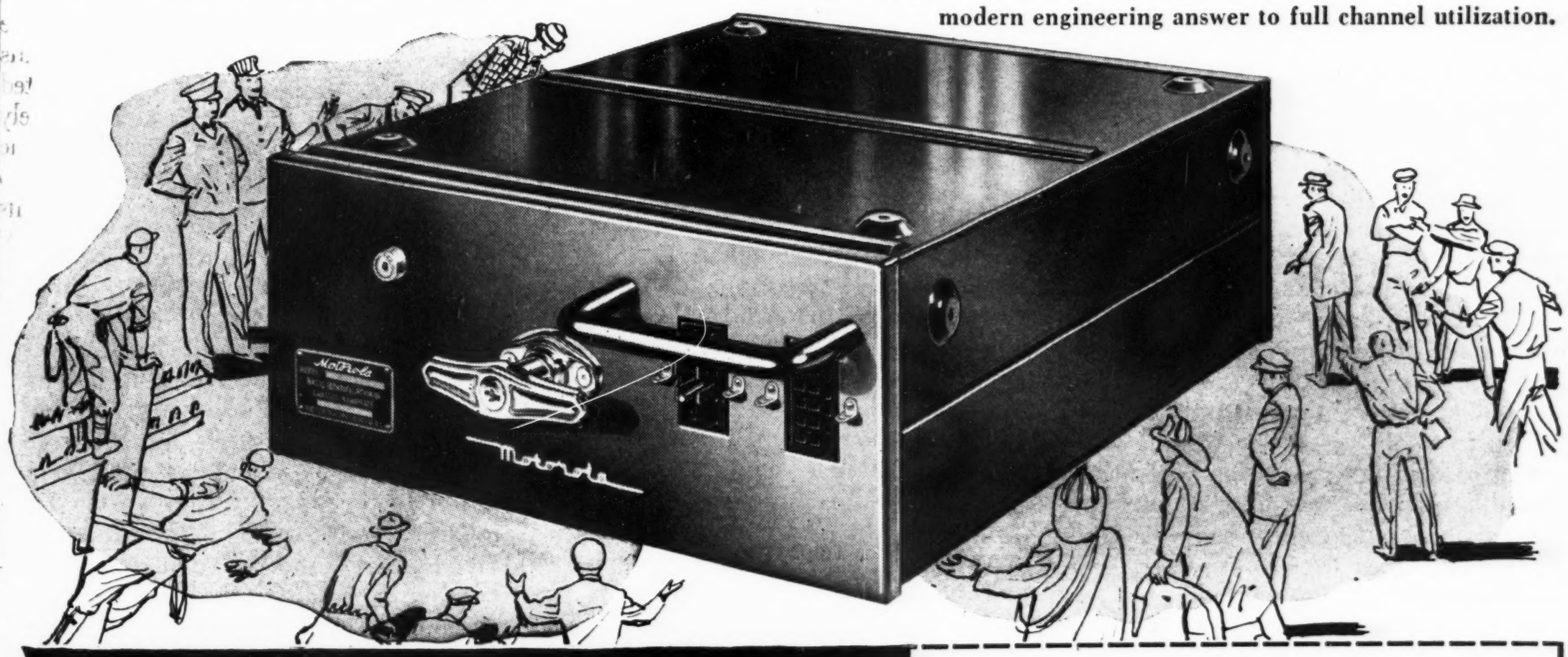

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favorable or unfavorable group opinion to the pipeline crossing the lands.

The land agents are in a precarious position, so to speak, as they begin to "feel" the trend. They attempt to find the real leader or leaders who have vision and appreciation of progress and its value to every person in the community, individuals who see in progress more taxes and better schools, increased employment, the building of homes, and an increase in local business, all of which result in improved social life and living conditions. When the land agents recognize such individuals, who realize and appreciate the improvement and progress we propose to bring to the community, their assistance and influence are solicited in bringing about an attitude of cooperation in the solving of the problems which confront the landowner as well as the pipeline company.

Buying Easements

After the engineers have completed the survey and the title to each tract of land to be crossed is established, the land agents proceed to buy the right-of-way easements.

This instrument contains provision for the rights of both the grantor and the grantee. To begin with, let us keep in mind that the land agent is approaching the landowner to purchase the right-of-way agreement, the consideration paid him being for the easement alone, which carries with it the right of ingress and egress. All damages caused by construction to crops, fences, timber, etc., plus damage to private roads or the surface, caused by the exercise of the right of ingress and egress, are to be paid for after construction, when such damages can be easily determined.

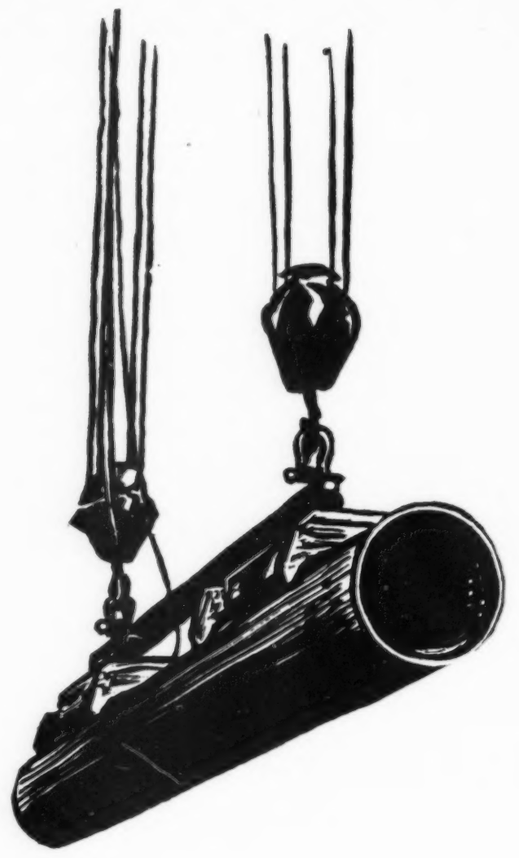
The landowner usually persists in confusing the issue by valuing the easement on the basis of damages caused by construction. It becomes difficult, in many instances, for the land agent to distinguish for the landowner the difference between paying for the easement as an entirely separate and unrelated transaction from satisfaction for damages. The landowner, in his attempt to get more than is being offered him for the easement, invariably comes back to damages as the basis for evaluation. This provokes the question, "What is the basis of value of an easement?" An attempt to answer this controversial question will not be made. However, there is strong argument that the consideration paid for an easement should be based on the fee value of the land. If this basis is used, then what percentage of the fee value would be proper?

As an illustration, say that 20% is used, paying a landowner $100 per acre when his land is valued at $500 per acre. On the same basis, suppose that the land of another grantor is valued at $15 per acre, the figure for the easement would be $3 per acre. These are extreme cases. However, it seems obvious that it would be difficult to convince a landowner that it is worth less to grant an easement on his farm than on his neighbor's. Nevertheless, the argument remains that unless the value of the easement is based on the fee value of the land, it is an arbitrary offer without basis.

In theory, the price of the easement should be exactly the same per rod or per acre to each landowner, regardless of fee value, location of the land, type of soil, or its use. The burden on the land is the same in every case. The fee value, location, type of soil and its use, are facts to be considered in arriving at the *amount of construction damages only.*

The inflation and resulting rising prices of land, farm products and of livestock, together with the considerable national publicity during and since World War II of gas and oil production and reserves, coupled with accounts of transmission pipelines from the southwestern area to many points in the nation, have given the general public and, especially, the owners of lands crossed, an inflated opinion of values, increasing the problems almost beyond imagination or an economical solution. The leasing by the government of the Big and Little Inch pipelines for conversion to natural gas, followed by the sale of these lines with the resultant publicity, revealing the bids and sale price, has contributed to the present idea of the value of right-of-way agreements, commonly equal to, and even far greater than the fee value of the land. No explanation is made of the fact that it costs big because it is big; it has a big job to do for a big area, comprising a great number of people and industries, at a small, regulated and conservative profit. Therefore, one of the problems we face is a lack of understanding and knowledge on the part of the general public of our type of business.

Although this publicity tells a story of leadership, progress, achievement and engineering, in keeping with this fast-moving age, the individual whose lands are crossed in the construction of pipelines does not see it in terms of progress and public welfare, but rather, with a natural, selfish interest in personal and material gain, and, rightfully so, provided the demands are fair and justifiable as to the value placed on the rights in the lands conveyed. An increase in taxes to the benefit of schools, county and state; an increase in local employment; com-



munity growth and greater income for the community as a whole based on such growth, are all benefits the landowner recognizes, but for which he should not be penalized in arriving at the valuation of the easement he is conveying. Likewise, he should not expect a return beyond the value of the easement based on so-called nuisance or damage by reason of the annoyance caused by the operation and maintenance of the pipeline, or, damage caused to the remainder of the farm by reason of the right of ingress and egress across the land, to and from the right-of-way, or other unrelated claims he contends for in his valuation of the easement.

How Much Justified?

Considering the theory that landowners want too much money, that a pipeline does not damage their property, etc., and statements relating to the miles and miles of right-of-way which have been purchased at 25 cents per rod—this would be justified if it weren't for the fact that 25 cents some years ago was equal in purchasing power to the dollar value of today, or possibly more. Then the ditch was dug by hand, and the small screw pipe was hauled by team and wagon. Joints were made up the hard way, pipe lowered in with mope poles and tripods, and the laborer was fortunate to earn 25 cents per hour. The percentage of cost of the right-of-way compared to the overall cost of construction may have been greater than present day costs.

Later, the right-of-way easements were purchased on a basis of 50 cents per rod, and likewise, trucks started hauling larger pipe, Dresser couplings, ditching machines, side-boom tractors, dozers, draglines and other equipment, materials and new methods

were introduced, and again the percentage of cost of the right-of-way remained in line—*or did it?* We are all aware of the greater cost of improved equipment and methods, but we do not want to get cross-wise with the landowners and cause ourselves no end of trouble thereby, just because our costs are greater. They consider what it should be worth to us. We consider what it should be worth to them. In between these two ideas, there should be a point of fairness. This point remains continually controversial and a problem to the pipeline companies and landowners alike.

The statement has been made that "people generally resist change." Could it be that our ideas have not kept pace with progress and changing conditions? Is our vision impaired by the complaint that we cannot buy right-of-way at 25 cents per rod as we once did (and thereby locate the source of some of our troubles) or, do we meet the issue of present day values with an understanding of fast-changing conditions and progress? In trying to solve our right-of-way problems, we should analyze the landowners' position as well as our own.

With the privilege to condemn under the right of eminent domain, a firm policy can be adopted to pay all landowners a like amount per rod or per acre. This policy builds much good will toward the company. The landowners observe condemnation proceedings being instituted against those few who refuse to accept payment on the established cost-per-rod basis and who demand more money than the others have received. When the consideration offered is generally held to be fair, it can rightfully be assumed that the few landowners condemned are the trouble-makers along the line, attempting to influence their neighbors against us and causing untold difficulty in the acquisition of right-of-way.

Some of the condemned landowners continue to be "problems" when the award is too high, and the case goes to the appellate court. Others willingly make settlement, however, when they find that the company will spend considerable money and effort in taking the case to a higher court, all with the purpose of carrying out the promise that all would be paid alike. This firm company policy is of material help in acquiring right-of-way for main lines and especially for loop lines and in the settlement of resulting damages. No landowner approves of others gaining an advantage. Therefore, this policy of equality holds the respect of the majority.

For those who cannot or do not condemn, under the right of eminent domain, the problems with this minority group are often extremely difficult to solve. Good relations with the majority can be seriously damaged if a few receive more compensation than the established basis generally accepted.

The "Unusual" Type

It is providential that the majority of people are normal human beings, eliminating a great many of our problems. A "normal" person is one who is not strikingly different from the great majority of people. With this type we can reason, and successfully do business. But unfortunately, there are often a few of the unusual type, such as Mr. A, who contemptuously declares he wants nothing to do with the pipeline. "Do others before they do you" is his motto. "Since everybody is against me"—he may have reasoned with himself—"I will take what I can, and keep what I get." Mr. A is a difficult case, and he attempts to force the company which cannot exercise the right of eminent domain to "pay through the nose."

Then, there is Mr. B, who is an "aginner." No matter what the land agent proposes, Mr. B is against it. Usually he is not a man of much consequence in the community and at home is a little on the "henpecked" side. So, with the land agent, he enjoys the power of being in the "yes or no" position, and loudly voices his objections to pipelines and pipeline companies in general.

There are many other types. Mr. C is a "fusser." He fusses and fumes every time the land agent approaches him and attempts to engage him in conversation pertaining to the easement. Mr. D is a "buck-passer" in a large group of heirs, all of whom must sign the right-of-way agreement.

It seems obvious that in the case of the contemptuous Mr. A, the only solution appears to be by means of pressure or force—through neighbors, the holder of the mortgage on his farm, his banker or other local leaderships, or, by condemnation. Mrs. B is the answer to Mr. B granting the easement. To give recognition to her authority as master of the family affairs usually is an effective means of getting the signatures, and she is quite willing to demonstrate her position of authority for the land man, much to the embarrassment of Mr. B. It is possible to kid Mr. C out of his fussing, and Mr. D can be crowded onto the spot where he can no longer pass the buck to the other heirs.

As stated above, when the demands are beyond reason, land agents have a firm argument under the right to condemn. However, it is used only as a last resort to acquire a few outstanding tracts in order to clear the way for construction. It is to the advantage of the construction department, the operating department and the pipeline maintenance crews if the incidence of litigation is held as low as possible and eliminated altogether if it can be done. This policy creates good will for the company, resistance is broken down, and the company's employees are welcomed and accepted in the community. As stated previously, the few cases where condemnations are necessary invariably involve the types of people who have not only caused the land agents untold difficulty, but have created confusion among the neighboring landowners. Actually, the landowners who have traded with the pipeline company on a fair basis, seem to enjoy being on the winning side and in position to say to this contentious group, "I told you so." In these instances, litigation builds good will with the majority and is advisable.

Construction Problems

It has been the practice to start cutting fences and clearing right-of-way without any further consideration for the landowner. It is conceded that he sold us an easement, we have certain rights which were explained at the time the easement was purchased, "so, why not?" This is actually true; however, it is far better procedure to have a land agent contact the landowner or his tenant well in advance of the arrival of the fence gang or clearing crew to explain what is going to occur, and at approximately what time he can expect the first crew to enter his farm.

This advance notification will enable the landowner to move cattle, gather crops on the right-of-way to be cleared, or make whatever other preparation he desires prior to the arrival of the construction crew. The farmer likes to know what is going to happen, and when. After his conversation with a representative of the company, we are in much better standing with the individual than when he looks out some morning and sees a crew of men cutting his fences, destroying his crops and timber on the right-of-way, dozers levelling across drainage ditches and stringing trucks raising clouds of dust reaching into the sky like an atomic bomb explosion, or mired down on his private roads when it rains, all without recent prior notice. The farmer goes on his way a great deal merrier when his interests are considered and he anticipates what is to happen.

Further, if the crews keep fences in repair and fence gates closed, provide crossings for cattle over ditches if required, and if the construction men and equipment are held on the right-

of-way insofar as is possible, the relationship with the landowner will seldom be marred. However, if he wakes up some morning to find his cattle eating the corn crop, his hogs missing, and two hours are consumed in locating the family milk cow, the explosion blows a hole in our bank account under construction damages. Employees in a rush to get home after the day's work, or the early morning truck filling the fuel tanks of equipment are frequently the violators who leave gates open through which cattle stray. Drainage structures across private roads crushed and repair delayed beyond reason, entrance roads blocked, or other annoyances are the causes of ill will and difficulty in the settlement of damages or in any other contact between a company employee and the landowner.

Tricks

On the part of the farmer, it is not an unusual problem to find an individual who sows an old pasture to meadowland, being careful to cover the newly staked or cleared right-of-way the greatest length possible, or who breaks, beds and plants corn, cotton, or some other crop when he knows construction crews are on the way. The land so planted has ordinarily been idle for years and is worn out and poor, but he plants it and claims it was part of his plan, even before he sold the easement. Naturally, he now wants full damages on the area used and claims the crops will yield even above average on this particular spot.

Practically all springs and water wells near the right-of-way "never produce the water, after the pipeline has been constructed, as before." These are old stories, and remain our problems. Race horses' temperaments have been ruined by noise and confusion. I witnessed one of our courts allowing Mr. A to testify, in a condemnation case to acquire an easement across his 300-acre pasture, that the noise and activity of pipeline equipment would damage the temperaments of his 14 race horses some several thousand dollars. An objection was overruled on the ground that he had been raising race horses for several years. Though Mr. A had no idea of the extent of noise and activity of pipeline equipment, nevertheless the jury, judging from the amount of the award, evidently considered Mr. A exhibited "good horse sense."

Problems? They sound foolish. Yet land men face claims of this nature continually.

In order for the problems which arise between the construction crews and the landowners to be handled smoothly and without confusion, the land men assigned to construction must work in close cooperation with the spread inspector or superintendent. It is the duty of the land men to investigate all complaints and make a report of the findings to the person in charge of construction for the company. They should also check, for the supervisor, as to the fulfillment of provisions contained in the right-of-way agreement, particularly in regard to general clean-up, disposal of rock and debris, rebuilding of adequate fences, and other provisions for which the company is liable. The land agents are to buy additional ingress and egress roads required during the process of construction, which need could not be foreseen at the time the contract was executed. The above-mentioned supervisor, with the assistance of the land men, is to determine the additional roads to be purchased, if any, and he should not allow the contractor to use roads on which the right of use has not been, or cannot be purchased.

Weather conditions and the resulting problems very often change procedure of operations as originally planned by the construction department. The new circumstances should be explained to the landowner by the land agent, regardless of the fact that we have full rights under the terms of the right-of-way agreement. It has been found that such consideration pays dividends. Often, as a result, concessions are suggested by the landowner which the agent would have been reluctant to mention. A great deal of the trouble experienced during construction arises when this policy is not followed. Unfortunately, the land agent cannot be with the construction crews at all times and unless they foresee certain difficulties and notify the agent in advance, it is impossible for him to make the necessary contacts, and trouble results.

Damages

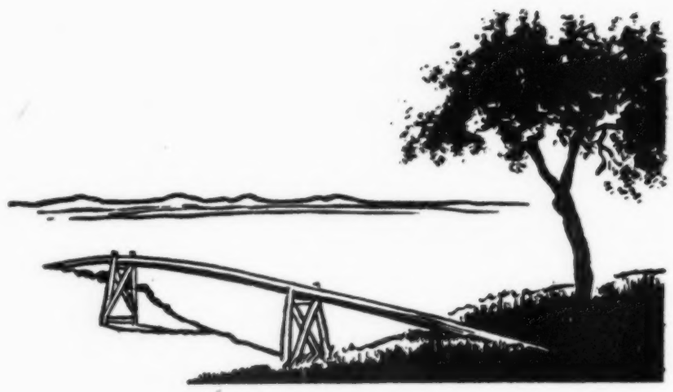
Some landowners attempt to stop construction, demand that the crews get off the property, even backing up their demands with a shotgun or legal action, if possible. The belligerent attitude of construction crews often aggravates the situation almost beyond solution. Many landowners say nothing until the land agent approaches them to settle damages. At this time, grievances come to light which cost the company a considerable amount in construction damages, additional clean-up or restoration work or in litigation. Additional cost is certain to arise in any future acquisition program for loop lines on the same properties. We know, of course, that many of these so-called grievances are not well founded, and, as in acquisition, they amount to an effort to justify exorbitant claims for damage.

However, negligence on the part of construction crews can be kept under control by the spread inspector or superintendent, just as in other phases of the work in construction of a pipeline. Trouble is the result, if the land agent attempts to deal directly with the contractor in regard to solving complaints. As we say on the pipeline, "Only one man should have the stroke," and he should see that all company interests are protected. He cannot successfully meet this responsibility unless he is in full knowledge of and is directing all operations. This prevents confusion in policy among contractors' crews and thereby eliminates many landowner problems caused by these employees misunderstanding construction procedure.

Clean-Up

After construction, the land agent and district pipeline foreman working together in the settlement of damages, and in performing additional clean-up work and restoration of the lands, face many unhappy landowners who would feel differently had they received the type of consideration mentioned. The worst complaints involve gates and fences down, cattle strayed and lost, crops destroyed by livestock, and unnecessary off right-of-way damage by equipment. It takes several months for the backfill to settle so that the maintenance crews can restore the land to its original condition as nearly as practical. The more grievances developed among the landowners during construction, the more costly and unpleasant this work becomes for the pipeline foreman in solving his maintenance problems.

It is evident that our problems during acquisition of the right-of-way are difficult to control. It is also evident that during construction, operation and maintenance, our problems can be largely controlled. Therefore, our policy and procedure during these phases of the work must create a good impression on the minds of the people whose lands we cross and in whose communities we live. This impression will be used as a yardstick to measure the character of the company we represent.



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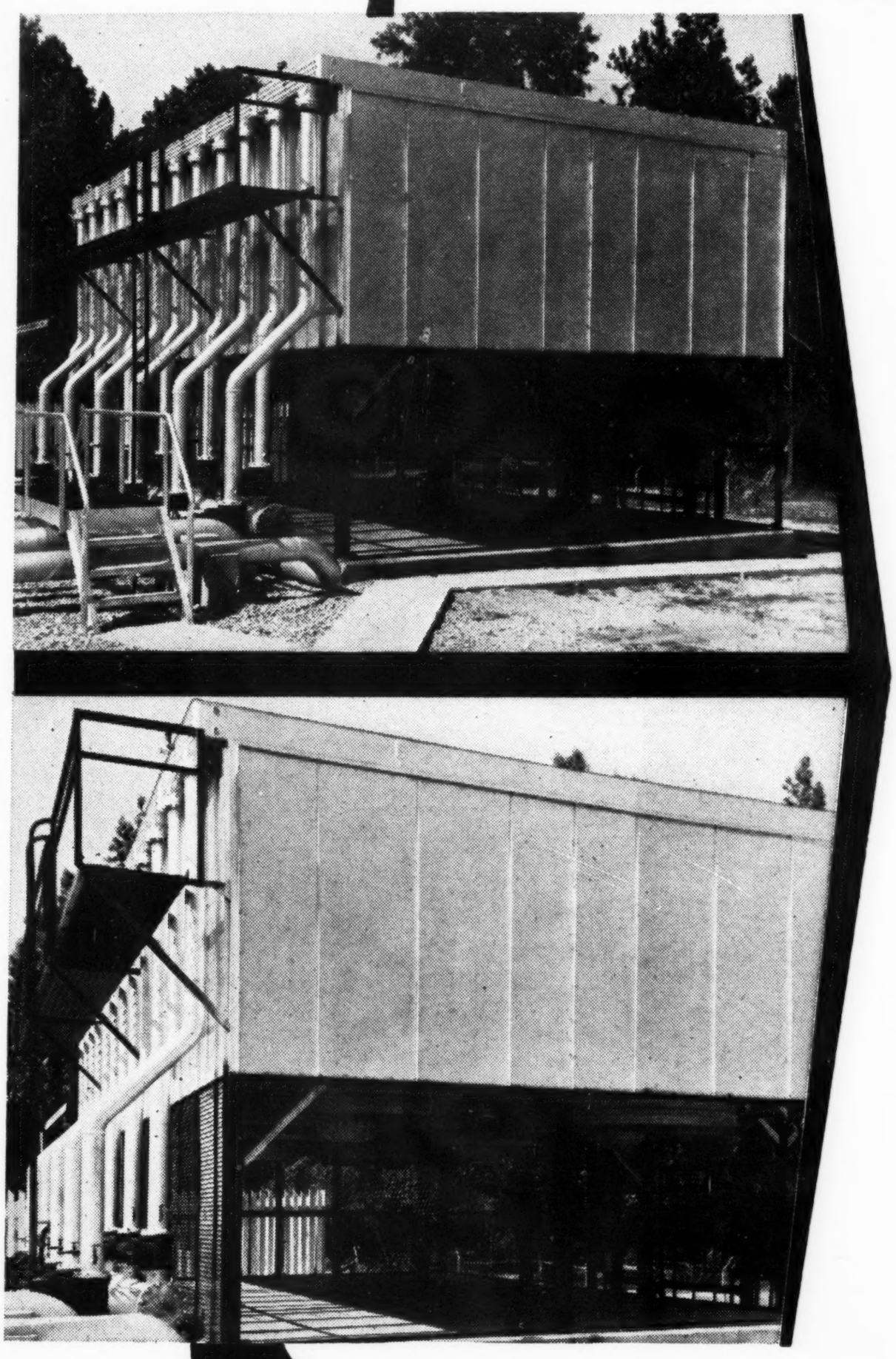

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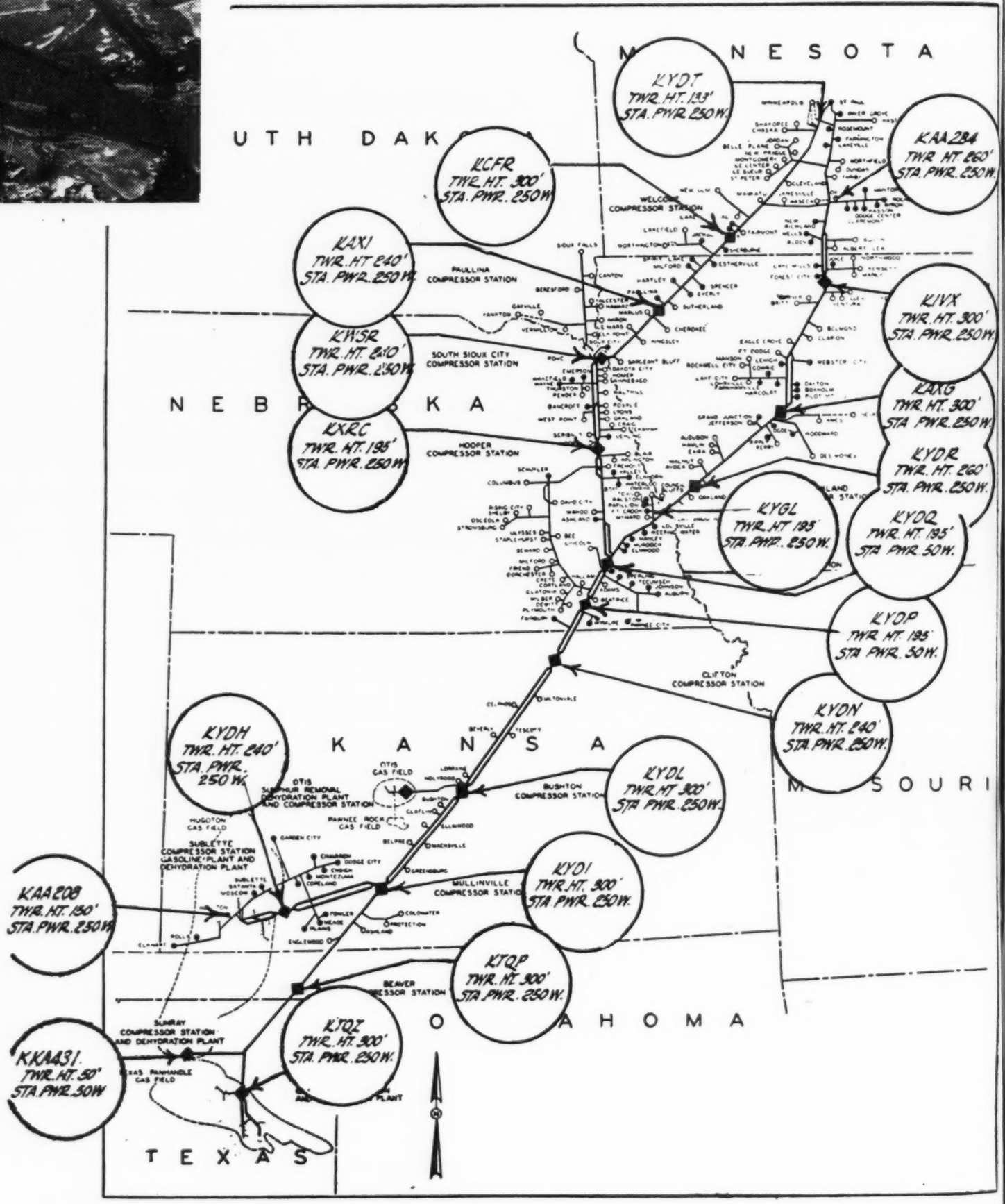
Northern Natural's Radio Helps Lick Spring Thaws

By W. B. HAAS

When the Platte river overflowed during the spring thaw, Northern Natural Gas Co.'s FM radio was one of the heroes in the job of finding and repairing a line break. Circle on flood area photo shows where the company "lost" its 16-in. line. At right is a map of the system, showing radio stations. Compressor stations are indicated by square blocks.


KYDT TWR. HT. 139' STA. PWR. 250 W.
KAA 284 TWR. HT. 260' STA. PWR. 250 W.
KCFR TWR. HT. 300' STA. PWR. 250 W.
KAXI TWR. HT. 240' STA. PWR. 250 W.
KIVX TWR. HT. 300' STA. PWR. 250 W.
KWSR TWR. HT. 210' STA. PWR. 250 W.
KAXG TWR. HT. 300' STA. PWR. 250 W.
KXRC TWR. HT. 195' STA. PWR. 250 W.
KYDR TWR. HT. 260' STA. PWR. 250 W.
KYGL TWR. HT. 195' STA. PWR. 250 W.
KYDQ TWR. HT. 195' STA. PWR. 50 W.
KYDP TWR. HT. 195' STA. PWR. 50 W.
KYDH TWR. HT. 240' STA. PWR. 250 W.
KYON TWR. HT. 240' STA. PWR. 250 W.
KYDL TWR. HT. 300' STA. PWR. 250 W.
KAA 208 TWR. HT. 150' STA. PWR. 250 W.
KYDI TWR. HT. 300' STA. PWR. 250 W.
KTQP TWR. HT. 300' STA. PWR. 250 W.
KTQZ TWR. HT. 300' STA. PWR. 250 W.
KKA 431 TWR. HT. 50' STA. PWR. 50 W.
WELCOME COMPRESSOR STATION
PAULINA COMPRESSOR STATION
SOUTH SIOUX CITY COMPRESSOR STATION
HOOPER COMPRESSOR STATION
CLIFTON COMPRESSOR STATION
OTIS SULPHUR REMOVAL DEHYDRATION PLANT AND COMPRESSOR STATION
BUSHTON COMPRESSOR STATION
SUBLETTE COMPRESSOR STATION GASOLINE PLANT AND DEHYDRATION PLANT
MULLINVILLE COMPRESSOR STATION
BEAVER COMPRESSOR STATION
SUNRAY COMPRESSOR STATION AND DEHYDRATION PLANT
HUGOTON GAS FIELD
PANHANDLE GAS FIELD
PAWNEE ROCK GAS FIELD
NEBRASKA
KANSAS
OKLAHOMA
TEXAS

IT is difficult to fully itemize and appreciate the numerous uses for our two-way FM equipment in handling operating and maintenance jobs up and down our pipeline system. FM radio, such as we have, really plays a large part in getting repair crews on emergencies in a minimum length of time and then, through close contact between crews on the job and our fixed stations, assuming that all information pertaining to the job is readily at hand.

Numerous miles of driving and hours of delay are saved through the ability to advise storekeepers at the next fixed radio station of the exact materials, equipment and men required for completing any emergency or repair job.

In line cleaning, during the shutouts necessary from time to time, our field men are able to maintain close contact with the dispatching department on all matters including the handling of valves and controls of gas pressure. Pressure readings from each valve or pressure point may be immediately reported whenever necessary or desirable.

In our situation the use of the radio and the relaying of messages along our radio lines have enabled us to maintain communication when telephone lines are down or out of commission. This is necessary for dispatching and insures communication with all points at all times. Above is a schematic drawing of our pipeline system, showing the location, call letters, height of radio towers and output of our various fixed stations.

The overall effectiveness of our present FM radio equipment is illustrated in the following recent examples:

The spring thaws, following in the wake of Nebraska's "Operation Snowbound," resulted in a break in one of our branch lines with a discontinuance of service to five communities. Also it brought on an ice-jam on the Platte river upstream from our line which caused the river to overflow, spreading over its flood plain and undermining a portion of our line which resulted in a line failure.

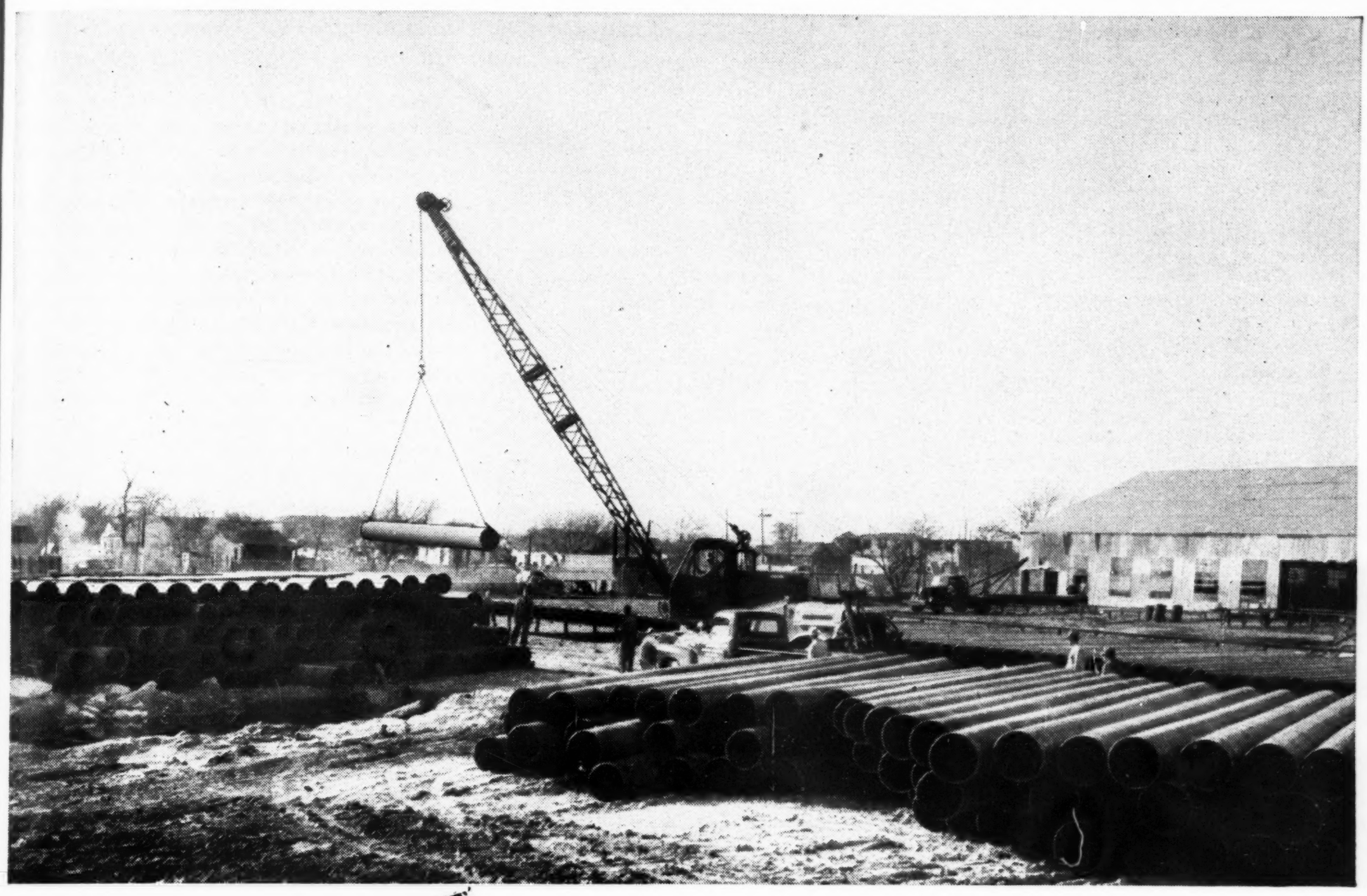
The use of four-wheel-drive equipment and tractors for getting materials and supplies through to make repairs was necessary as the roads were impassable. Our men completed repairs on both of these jobs under adverse conditions in record time. The division superintendent commented in closing his report:

> We wish to state that the aid of radio equipment on these jobs was invaluable. The ability to dispatch messages on the spot and checking back relieved the uncertainty of phone messages and guess work which occurs so often in jobs of this nature. It is our opinion that radio equipment saved us many, many hours of lost time in completing emergency repairs.

In another emergency, one of our Kansas superintendents reported as follows:

> The radio was used in getting some of our

Mr. Haas is assistant superintendent of pipelines, Northern Natural Gas Co., Omaha, Nebr.



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men on the job. We called our Bushton station by radio, and they in turn contacted the employees by telephone. When a test connection was broken off at our No. 13 valve setting, the material was relayed to us after contacting the plant by radio. A backhoe crane and side boom tractor hired at Great Bend were directed to our Bushton plant. When they arrived at the station, they were directed to our job by radio, which was in one of our company pickups, in order that there would be no delay in their arriving at the site of our emergency repair.

The boys of the Mullinville district as well as the equipment from this area were called out by radio inasmuch as the telephone circuits were busy. The same procedure was followed with reference to Clifton in order to insure that proper equipment and supplies would be brought along as the telephone circuits to Clifton were also busy. Our radios were again in use while purging the line and when the town of Holyrood was put back on the line. In these two instances alone, radio saved driving cars up and down the road several miles to a telephone with the probability that all the circuits would be busy.

In the gas fields the radio is invaluable for insuring ready and instant communication between the operators and field headquarters so repair crews may be hurried to the job whenever well lines are frozen off or a well needs blowing. If automotive equipment fails, the location of the operator may be immediately given to headquarters. All items pertaining to field operations and maintenance and all needs for help from the operators in the field may be immediately communicated to field headquarters so that all necessary work is done with much dispatch.

Presently, we have 3 Motorola 50-watt and 17 Motorola 250-watt fixed stations installed. We have 73 Motorola 30-watt mobile units and are installing 33 more. We see a definite advantage in having FM radios in all transmission department cars and trucks. We now have mobile units in strategic field cars and pickups.

PIPELINE NEWS

Peoples Gas Wants a Third Line to Serve Chicago

Peoples Gas Light & Coke Co., Chicago, which is already tapping two natural gas pipelines from the South, has formed a subsidiary to build a third line. The $100-million project, scheduled for completion in 1953, would have an initial capacity of 340 MMcf, to be ultimately raised to 500 MMcf, more than the combined capacity of the two lines now serving the area.

Last month the company petitioned the Illinois Commerce Commission for permission to invest $250,000 in initial capital stock of the Texas Illinois Natural Gas Pipeline Co., the subsidiary which will build the line.

The line may be in operation sooner than 1953 if negotiations for gas in the Houston area can be consummated soon, according to James F. Oates, chairman of Peoples Gas, who is also chairman of Texas Illinois.

The line will extend 1000 miles from Houston to Joliet, northern terminus of the two present lines, where gas would be picked up by Chicago District Pipeline Co., another Peoples subsidiary, and brought to the Windy City.

Pipe, which is already contracted for, will be 30-in. Personnel of Natural Gas Pipeline Co. of North America, operator of present lines serving Peoples from the South, and another subsidiary, would man the line.

The project was not yet ready for FPC consideration.

Secrecy Shrouds Plans for $300-Million, 1300-Mile Line

The nation's most costly gas line, if not the longest nor the largest in diameter, was reported last month in the final planning stage — but where it was headed was a mystery.

The line, which it is rumored would cost $300 million — a full $100 million more than the Transcontinental line being built from Texas to New York City — is being backed by the American Gas Transit Corp. Ltd., a Canadian firm, with British money in its till.

Briefly, here's the picture:

Alec Crowell, well-known Louisiana consulting engineer (prominently mentioned for Max Ball's old spot as head of the Interior Department's Oil & Gas Division) completed a study some time ago of availability of reserves in Louisiana and the Gulf, and found that 20 trillion cu ft is available from 640 wells in the area, 52% of which are unconnected.

The law firm of Chill, Landman, & Gordon, Jackson, Miss., has been soliciting proposals for purchase of uncommitted gas from lease owners. In letters of solicitation, the firm states it is seeking 6 trillion cu ft, 500 MMcf daily. Reportedly, 10 cents per Mcf is being offered for gas at 15.025 psi and 60° F, higher than the prevailing field price.

The line would be 1300 miles long, 30 in. in diameter, and would carry gas at 1000 psi. It would, it is said, originate in Krotz Springs field, 40 miles east of Baton Rouge, La.; its terminus might be anywhere from the Great Lakes region to New England, although the former is rumored to be a better bet.

Construction Under Way On 214-Mile Lone Star Line

Construction was started recently on the new 214-mile pipeline system which will serve new Lone Star Gas Co. territory in the hill country of southwest Texas. The system joins Lone Star's main line in the Pottsville field west of Hamilton, Texas, and extends south to the town of Lometa where it forms a junction. Lines from there will extend southwest to Kerrville and southeast to Marble Falls.

First construction was begun with 6-in. invasion pipe which was conditioned for service as welded line in pipe yards set up in three locations in the new territory. The lines will be constructed of 10-, 8-, and 6-in. pipe.

Town plant distribution systems are also under construction with completion nearing on the first of 10 which will be served by the new line. Kerrville, terminus of the west leg of the new line, already has a distribution plant operating on LP-Gas. The system was purchased by Lone Star in 1948, and will be converted to natural gas when line construction reaches that point. Other towns to be served by the new line include Lometa and Goldthwaite (now under construction), Lampasas, Burnet, Bertram, Marble Falls, San Saba, and Fredericksburg. A 4-in., a 6-in., and a 4-in. tap line will serve Goldthwaite, San Saba and Bertram, respectively.

Montana-Dakota Would Build

FPC has been asked to authorize construction of a proposed $8,419,880 pipeline project which would make available an additional 25 MMcf daily to customers of Montana-Dakota Utilities Co. in Montana and the Dakotas.

A joint application filed with FPC by Montana-Dakota and Montana-Wyoming Gas Pipe Line Co. includes plans for a 340-mile, 12¾-in. pipeline extending from the Worland field in Wyoming to Cabin Creek compressor station in Fallon county, Montana; a combination gas compressor, dehydation, and sulphur removal plant near the field; and two branch lines.

New Facilities for Kentucky

Central Kentucky Natural Gas Co. has received a Federal Power Commission okay for $1,643,200 worth of facilities designed to increase the company's deliveries in northeastern Kentucky and the Cincinnati (Ohio) area.

The company was authorized to construct 23 miles of loop line between Menifee and Mt. Sterling, Ky.; 12,500 ft of line from Tennessee Gas Transmission Co.'s measuring station at South Means, Ky., to Central Kentucky's Menifee compressing station; and six additional compressor units.

Manitowoc Readying for Gas

In line with activities throughout Wisconsin, the Wisconsin Fuel & Light Co. at Manitowoc, 90 miles north of Milwaukee, has purchased and is unloading pipe for use in bringing natural gas to that city as soon as it is available.

Crews of pipelayers are now running the Wisconsin end of the natural gas pipeline from Milwaukee southwest toward a point in Illinois, where the line will connect with the main line of the Michigan-Wisconsin Pipe Line Co. North of Milwaukee, when the line reaches that city, the line is to be extended along the lake to Sheboygan, Manitowoc, Two Rivers, and, farther inland, to the Fox River valley as far north as Green Bay.

Coordinated Pipeline Radio Organization Established

In line with a recent Federal Communications Commission order, long-haul natural gas systems having no major distribution properties will be assigned radio frequencies in the petroleum service category, along with oil pipeline operators. Gas companies whose properties are used primarily for distribution will be provided frequencies in the power utilities service category.

A complete plan for the assignment of frequencies in the utilities category has been worked out and is presented in summary on page 23 of this issue.

To assist the FCC by planning a national program of suggested frequencies in the petroleum service category, the National Petroleum Radio Frequency Coordinating Assn. has been organized. Heading the gas industry representation is Warren T. Bulla, Natural Gas Pipeline Co. of America, Chicago, vice chairman of the group.

Further details concerning frequency assignments will be considered at a meeting of the AGA Mobile Radio Committee (of which E. M. Borger, The Peoples Natural Gas Co., Pittsburgh, is chairman) followed by meetings of the committee with the petroleum and power groups.

Regional chairmen for the new petroleum group, and the territories in which they will operate, are the following:

Region 1 — W. A. Shipman, United Fuel Gas Co., Charleston, W. Va. (Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia and West Virginia.)

Region 2 — J. D. McCullough, Buckeye Pipe Line Co., Lima, Ohio. (Ohio, Kentucky, Indiana, Illinois, Michigan and Wisconsin).

Region 3 — L. C. Bomar, Southern Natural Gas Co., Birmingham, Ala. (North Carolina, South Carolina, Tennessee, Alabama, Georgia and Florida).

Region 4 — R. S. Caplan, Gulf Refining Co., Houston. (Texas, Arkansas, Louisiana and Mississippi).

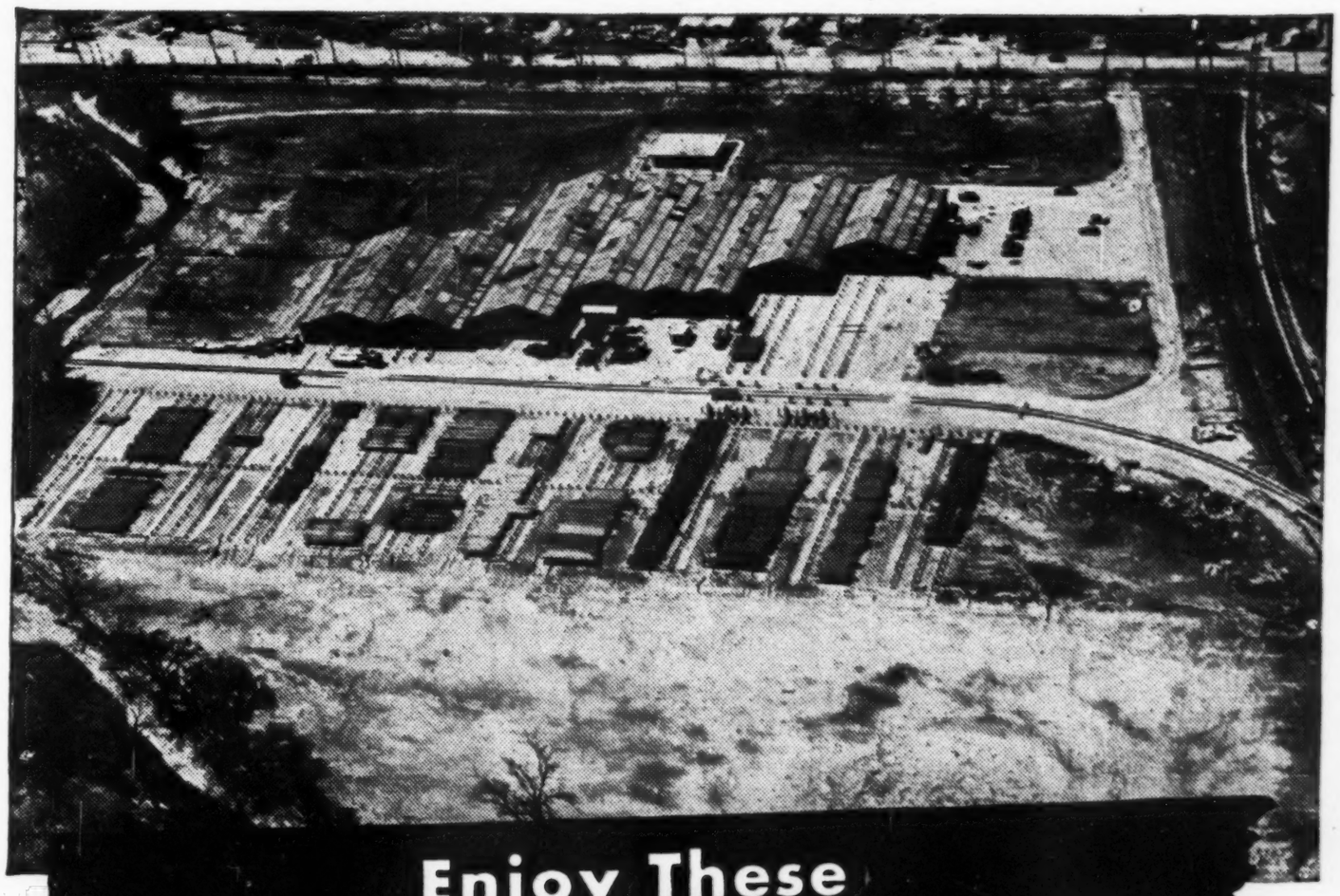
Region 5 — W. T. Born, Amerada Petroleum Co., Tulsa, Okla. (Oklahoma, Kansas, Nebraska, South Dakota, North Dakota, Minnesota, Iowa and Missouri).

Region 6 — K. S. Hagius, Colorado Interstate Gas Co., Colorado Springs, Colo. (Montana, Wyoming, Colorado, Utah and New Mexico).

Region 7 — J. A. Polemus Jr., Standard Oil Co. of California, San Francisco. (Washington, Oregon, Idaho, Nevada, California and Arizona).

San Juan Case Reopened For Added Reserves Evidence

Alleged failure on the part of El Paso Natural Gas Co. to prove that it owns or has contract commitments for sufficient San Juan basin reserves to meet "additional demands which would be placed on its system" has blocked FPC approval of the company's application to build a 451-mile natural gas line from the field in the New-Mexico-Arizona-Colorado-Utah area to Topock, Ariz., near



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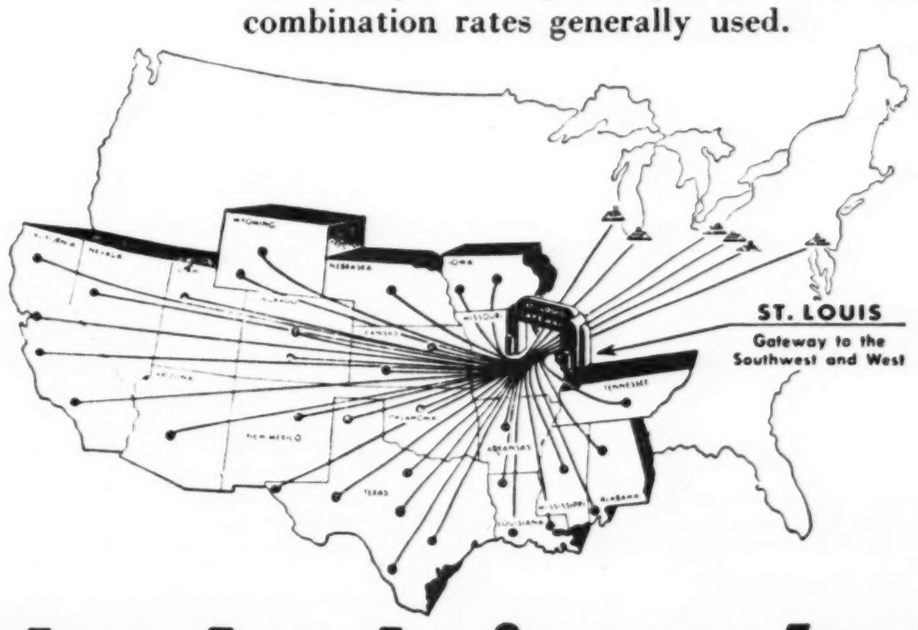

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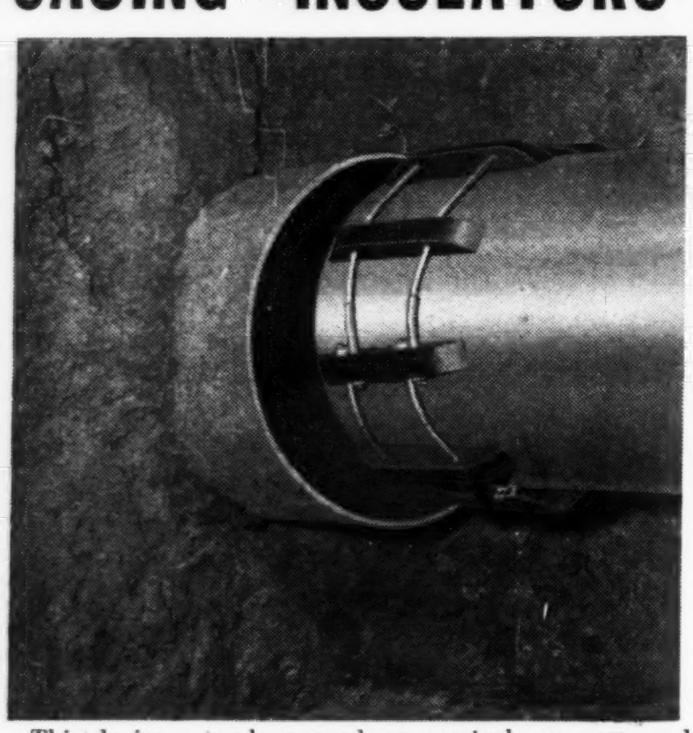
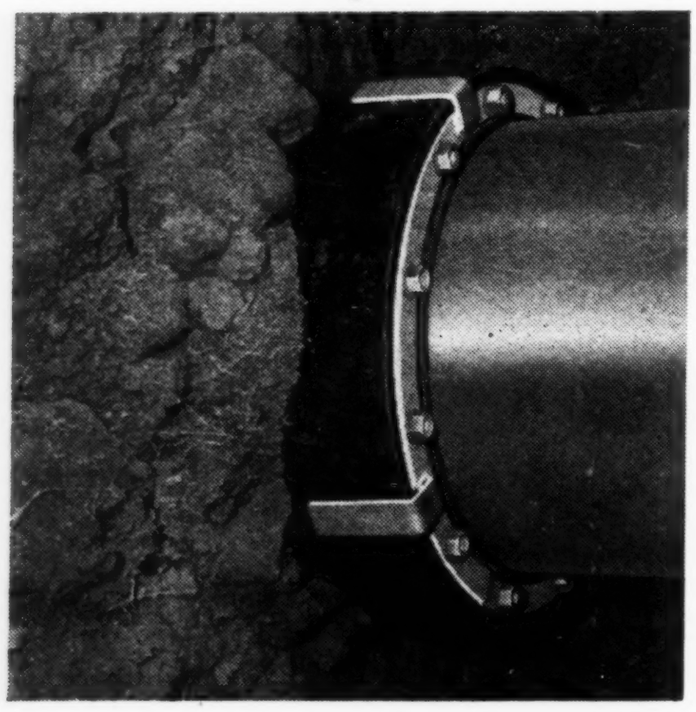


This device—simple, rugged, economical—supports and guides the leading end of coated line pipe into the right-of-way casing under railroads and highways.

Additional Casing insulators, clamped around the pipe every 20 to 30 feet, serve three purposes.

1—To protect the pipe coating.
2—To act as pipe skids, facilitating installation.
3—To separate pipe and casing, assuring permanent insulation for cathodic protection.



WmSEAL CASING BUSHINGS*

Equipped with exclusive T-gasket for positive watertight seal and insulation of pipe from steel flanges, this improved "casing seal" is designed for easy installation at each end of pipe-line casing under right-of-way crossings.

WmSEAL Casing bushings are readily installed because they offer:

- Large center hole for loose fit around coated pipe.
- Generous clearance inside of casing before bolts are tightened.
- Easily opened after removal of only one bolt, for closing around installed pipe line. WmSEAL Casing Bushings are widely used as wall sleeves for valve boxes, manifolds, etc.

*Patents Pending.

THE PIG WITH THE POKE
CLEANS PIPE LINES
T. D. Williamson, Inc.
TULSA 9, OKLAHOMA

SOMEWHAT REMINISCENT of a sidewinder at rest is this curvesome stretch of 20-in. line being laid by Lone Star Gas Co., Dallas, from Opelika to the Dallas-Fort Worth area. This line will make the sixth point of feed for Dallas, and a 25-mile loop around the city will also tie in to a main line supplying Fort Worth. Scene: Near Dallas terminus.

the California border. However, the commission announced last month that proceedings were being reopened and would be held open for a period of three months to permit further hearings if petitioned by El Paso or Pacific Gas & Electric Co., San Francisco, which would receive a major share of the gas.

The San Juan project has had tough sledding all along. Proposed last summer, together with an application of El Paso's and PG&E's to build a line from the Permian basin of Texas and New Mexico to San Francisco, the line was frowned upon by FPC because of its financial structure, and was severed from the Permian docket late in February to permit passage of the latter by March 1.

El Paso proposes to deliver 150 MMcf to PG&E plus 15 MMcf for Southern Union Gas Co. distribution in Arizona communities, and PG&E wants to increase to 400 MMcf per day the capacity of facilities to receive 250 MMcf approved in the Permian docket. But FPC says El Paso has committed to it only 52 billion cu ft from the Blanco field, only 3½ years supply at the proposed 20-year withdrawal rate of 41 MMcf per day. The commission also questioned the basic assumption and methods used in determining reserves estimates from Blanco and Barker Dome, from which 110 MMcf per day for 25 years was scheduled.

200 Miles of Ohio Line In

Two hundred miles of 26-in. pipeline have been laid by crews of Texas Gas Transmission Corp. to date on the company's 800-mile Texas-Ohio line. W. T. Stevens, in announcing the progress on the line, said he expected preliminary operation of the pipeline to start before the end of the year.

Delivery of gas before winter's cold spell hits is the aim of the builders — they started work about 2½ months ago.

Texas Gas was observing the 20th anniversary of operations of its predecessor companies (Memphis Natural Gas Co. and Kentucky Natural Gas Corp.) as Mr. Stevenson made the progress announcement last month.

Initial capacity of the Texas-Ohio line will reach 304 MMcf per day. In the spring of 1950, that total will be boosted to 400 MMcf per day. Supplies from the new line will be distributed to existing customers in Louisiana, Arkansas, Mississippi, Tennessee, Kentucky, Indiana, and Illinois, in addition to major distributing utilities in Ohio and Pennsylvania.

Jersey Asks Inch Connection

Jersey Central Power & Light Co. has requested permission of FPC to build a 39.4-mile natural gas pipeline to connect with Texas Eastern Transmission's Big Inch.

Earlier, the commission had ordered Texas Eastern to deliver 5 MMcf daily to Jersey Central, which now distributes only manufactured gas to Cape May, Ocean, Monmouth, and Morris counties.

Last month, hearings before the state public service commission were completed on Jersey Central's request for an increase in the rates of its minimum users. Consumers using up to 1 MMcf monthly would pay a rate hike calculated to boost Jersey Central's annual revenue by $526,000. The increase would set new prices at $1.50 for 200 cu ft of gas. Formerly, the rate has been $1.05 for 300 cu ft.

Company attorneys and those representing the interests of Monmouth county were to file briefs on the case by Aug. 10.

Southern Natural Wants Loops

Southern Natural Gas Co. is seeking FPC approval of a project to construct natural gas transmission facilities designed to increase the company's capacity in two branch lines in Alabama and Mississippi and to supply natural gas to a cement company in Alabama. Cost of the project is estimated at $1,226,070.

The company is proposing to build about 38 miles of branch loop lines; submarine crossings of the Warrier and Chattahoochee rivers; and a 7.4-mile extension of a branch line to supply the Southern Cement Co. plant in Shelby county, Ala.

Interstate Rate Squabble

FPC has suspended, pending hearing and decision, the supplementary rate schedule of Interstate Natural Gas Co. Inc., under which, FPC says, there is a "disproportionate reduction" of that company's deliveries of natural gas to Texas Gas Transmission Corp.

No hearing date has been set.

FPC said that under the new rate schedule, deliveries to Texas Gas were sizeably reduced, but deliveries to two other customers, Mississippi River Fuel Corp. and Southern Natural Gas Co., were not proportionately lowered.

Hugoton Has Drilling Plans

Application has been filed with the Kansas Corporation Commission for authority to drill 38 new natural gas wells in the Hugoton field with production earmarked for Kansas consumers.

The application was filed by the Hugoton Production Co., which recently acquired 97,000 acres of undeveloped gas land in the Hugoton field.

Progress Reports

TEXAS EASTERN TRANSMISSION CORP. has 122 miles of 26-in. natural gas pipe under construction by Associated Pipe Line Contractors Inc., Houston. There is one spread on this job under supervision of Jim Williamson. Twenty miles have been completed; job will be finished Oct. 15. Williams Bros. Inc. reports 12 miles completed on Texas Eastern's spread No. 1, near Woodsfield, Ohio.

NORTHWESTERN UTILITIES LTD. of Canada is building 17.7 miles of 16-in. pipe from Uncas, Alberta, Can., to Edmonton. Construction started June 20; completion date pending on shipment of pipe.

TENNESSEE GAS TRANSMISSION CO. has 24- and 31-in. pipe under construction from south Texas to West Virginia. Three spreads are working: No. 1 is building 53 miles of 30-in. line from near Tomball, Texas, to Trinity river under Morrison Construction Co. No. 2 (H. C. Price Co.) is building 50 miles of 30-in. pipe from Ruleville, Miss., to Greenville, Miss. No. 3 is 57 miles of 30-in. line being built by Tennessee Gas from the Arkansas-Louisiana border to West Monroe, La. All three jobs are scheduled to be completed this month.

KANSAS-NEBRASKA NATURAL GAS CO. INC. has Rumsey Bros. Pipe Line Construction Co. working on 44 miles of 6⅝-in. line from Elm Creek to Litchfield, Neb., 35 miles of 3- and 4-in. lateral from Litchfield to Broken Bow, Neb., 37 miles of 12¾-in. line from Shields, Kan., to Wakeeney, Kan., 6¼ miles of 12¾-in. line from Palco compressor station near Palco, Kan., to the northeast terminal of existing 12-in. line. Completion date: Sept. 1.

PEOPLES NATURAL GAS CO., Pittsburgh, has Willis- Austin Co. working on 38.34 miles of 14-in. pipeline beginning at the Big Inch northeast of Rockwood, Pa., and connecting with the Peoples 14-in. line north-

Three Specials from MIDWESTERN

1

OWENS-CORNING FIBERGLAS
COROMAT
UNDERGROUND PIPE WRAP

Field-tested, Coromat underground pipe wrap exhibited 300% greater tensile strength in application. Long, Fiberglas yarns integrated into the wrap in the forming process give added toughness permitting use of the longer 1200 foot rolls at higher wrapping speeds. Available in lengths from 75 to 1200 feet.

2

LEXINGTON SUPPLY CO.
GLASFAB
REINFORCING MEMBRANE FABRIC

Glasfab, a new hydrocarbon thermoplastic impregnate Fiberglas cloth, is widely used for handwrapping "hot spots," field joints, field repairs and for machine wrapping river crossings and "hot lines." Soft, pliable, and non-irritating to the hands, this wrap has a high tensile strength of 92 lbs. per inch. 75, 400, 800 and 1000 ft. lengths.

3

KAPCO* ROCK SHIELD

Kapco Rock Shield, a new protective cover for pipe and pipe coating, eliminates the need of padding the ditch in rocky terrain. Also, success has been noted in using the shield at river and road crossings and on river weights and pipe anchors. Midwestern's Rock Shield package includes strapping, ratchet strapping tool, and aluminum seals. *Manufactured exclusively by Keystone Asphalt Products.

For prompt delivery Midwestern maintains warehouse stocks in Tulsa, Oklahoma City, Houston, Kansas City and Newark, Ohio.

MIDWESTERN ENGINE & EQUIPMENT CO., INC.

105 N. Boulder, TULSA, OKLAHOMA, Phone 3-4113
15 S. W. 29th St., OKLAHOMA CITY. OKLAHOMA, Phone 7-4342

HOUSTON, TEX. — D. E. HUGHES, 5030 Arvilla Lane, Lehigh 9551
PITTSBURGH, PA. — JOHN R. WILSON, 555 McCulley, McKeesport, Pa., McK 2-5461
SHREVEPORT, LA. — TOM L. HOLCOMBE, Drawer 248, Cedar Grove Sta., 7-0241
ALBUQUERQUE, N. M. — IRA B. BRINER, 4629 N. 11th, 2-7598

THE GOLDAK *Featherweight* MODEL 87
PIPE LOCATOR

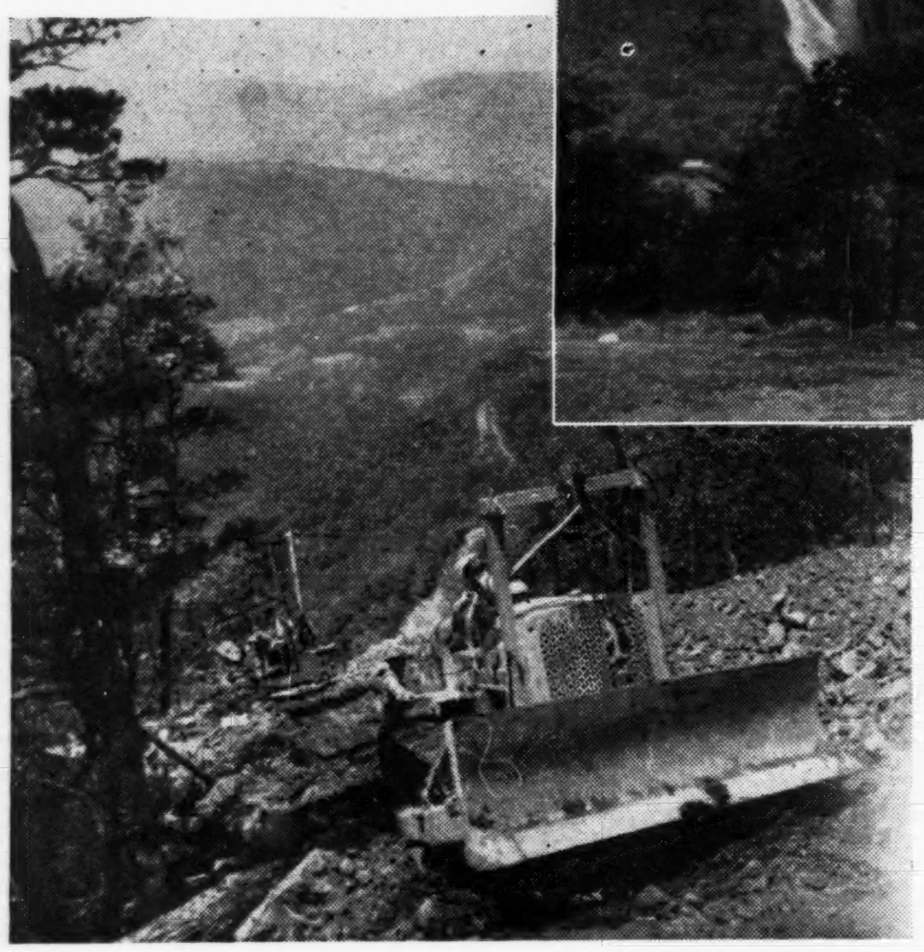
FINDS THOSE PIPES!

- Gives EXACT location of buried pipes, mains, services, gates, tees, ells, stubs, etc.
- Easy, reliable one-man operation
- Compact, ruggedly built
- Featherweight — only 11 lbs. complete
- Guaranteed superior performance

WRITE FOR COMPLETE DETAILS

THE GOLDAK CO. 1542 W. GLENOAKS, GLENDALE 1, CALIFORNIA

WHOOSH! and another hurdles is cleared in the race to bring gas to the central seaboard states. At right, a ditch is blasted across a West Virginia mountain stream by H. C. Price, contractor. Over 1.5 million lb of dynamite is being used along the line.



PUSH AND TUG is played by a dozer and a cat to get a bending machine up the nearly-vertical right-of-way. This was the first time stress-bend method was used in rugged terrain. Line is 200-mile 26-in. for Atlantic-Seaboard—Virginia Gas Transmission Corp.

east of Johnston, Pa. Completion is scheduled for Sept. 15.

ARKANSAS-OKLAHOMA GAS CO., Fort Smith, Ark., has just completed a project under A. C. Holder Construction Co. for 14 miles of 12-in. line from Spiro, Okla., to Arkansas border.

MOUNTAIN FUEL SUPPLY CO., Salt Lake City, is building 32 miles of 20-in. pipe from Coalsville, Utah, to Salt Lake City, under Enoch Smith Sons Co., contractors, It will be completed Sept. 15.

PHILADELPHIA ELECTRIC CO. gas department has the following work under way:
Spread A: 4.7 miles of 12-in. line from Rydal, Pa., to Sorrel Horse, Pa. (Tri-County Constructors).
Spread B: 5.2 miles of 12-in. line from Sorrel Horse to Trevose, Pa. (Counties Contracting and Construction Co.).
Spread C: 4.3 miles of 8-in. pipe from Trevose to Pendel, Pa. (Bucks County Construction Co.).
Spread D: 3.8 miles of 8-in. pipe from Trevose to Eddington, Pa. (Henkels & McCoy).
Spread E: 3.9 miles of 12-in. line in vicinity of Chester, Pa.
Spreads A through D will be completed Nov. 1; spread E will be completed Dec. 1.

SAN DIEGO GAS & ELECTRIC CO. has N.P. Van Valkenburgh Co. and Utility Construction Co. working jointly on a 52-mile, 16-in. line northward from San Diego. Pipe deliveries were made last month.

SKELLY OIL CO. has Wood Engineering & Construction Co. (Arp, Texas) working on 8 miles of 8- through 3-in. line of gas gathering system near Logansport, La.

ARKANSAS-LOUISIANA GAS CO., Shreveport, has Wood Engineering & Construction Co. working on 12 miles of 8- through 3-in. gas gathering line near Wascom, Texas.

PHILLIPS PETROLEUM CO. has had completed for it a 177-mile 3- to 24-in. gas gathering system near Hansford, Texas, by Vaughn and Taylor Construction Co., Wichita Falls.

TEXAS GAS TRANSMISSION CORP. has Latex Construction Co., Houston, laying 101 miles of 26-in. pipe from Sharon, La., to a point near Lake Village, Ark. Construction started June 13.

INTERSTATE NATURAL GAS CO. is building 29 miles of 22-, 20-, and 16-in. gas line west of Baton Rouge, La. Latex Construction Co. started work early in July.

NORTHERN NATURAL GAS CO. Omaha, Neb., has contracted with R. H. Fulton & Co. for 62 miles of 20- and 24-in. line at Garden City, Kan. Work will start in September.

PANHANDLE EASTERN PIPE LINE CO. has construction of a crossing of the Cimarron river under way under R. H. Fulton and Co. Work started July 15.

MICHIGAN-WISCONSIN PIPELINE CO. has reported the following progress on its spreads (see *GAS*, July 1949, p. 158). Spread No. 1, 74 miles of pipe lowered; Spread No. 2, 54 miles of pipe lowered; Spread No. 3, 99 miles of pipe lowered; Spread No. 4, 70 miles of pipe lowered. Each spread is scheduled for completion May 1, 1950.

HOME GAS CO. is having 24 miles of 12-in. pipe, 28 miles of 10-in. pipe, and 18 miles of 8-in. pipe being built by Williams Bros. Inc. in one spread from Pt. Jervis, N.Y., to Orangeburg, N.Y. About half of the 12-in. pipe is in; the job will be completed Nov. 1.

TEXAS GAS TRANSMISSION CO.'S Spread No. 10 — 80 miles of 26-in. pipeline in Jefferson county, Ind., and Warren county, Ohio, is now under construction by Midwestern Constructors Inc., Tulsa. R. C. Stanley is superintendent. Midwestern Constructors is also at work on a multiple 20-in. line across the Green river, near Slaughters, Ky., for Texas Gas.

TRANSCONTINENTAL GAS PIPE LINE CORP. is at work on schedules 4 & 5 — 216 miles of 30-in. pipeline from Demopolis, Ala., to Newman, Ga., under Midwestern Constructors Inc. M. T. Wilhite is superintendent of both jobs.

Pipeline Notes

ROBERT J. MULLALLY, district sales manager in charge of The Youngstown (Ohio) Sheet & Tube Co.'s Detroit office, has retired. His assistant, C. HIX JONES, has succeeded him. D. L. MARKLE JR. has been appointed district sales manager in charge of Youngstown's New Orleans office, succeeding the late ORVILLE B. EWING. Mr. Markle, who began his business career with the Public Service Co. of Illinois, has been associated with the Youngstown firm for 11 years.

HOBART C. RAMSEY has succeeded CLARENCE E. SEARLE as president of Worthington Pump & Machinery Corp., Harrison, N.J. Mr. Searle has been named vice chairman of the board of directors. Replacing Mr. Ramsey as executive vice president is EDWIN J. SCHWANHAUSSER, vice president in charge of sales since 1945. JOHN J. SUMMERSBY, long-time sales department employee, succeeds Mr. Schwanhausser.

ROBERT E. FRIEDMAN resigned recently as acting director of the Oil and Gas Division, Department of the Interior. Mr. Friedman, who had held the position since Max Ball resigned, has become assistant to the president of Trunkline Gas Transmission Co.

M. J. CROSE MANUFACTURING CO. INC., 2715 Dawson Road, Tulsa, Okla.— Bulletin BM 1001 describes a pipe cutting and beveling machine recently developed by this company for use on reconditioned, bent or egg-shaped pipe. This sturdy, light weight, cast aluminum machine has a split ring which facilitates installation over the pipe for cut-outs. The out-of-round cutting attachment allows operator to cut true bevels on bent or egged pipe. Machine to cut and bevel pipe up to and including 36-in. diameter are available for immediate delivery. A standard torch holder is furnished with those designed for 14-in. and smaller pipe and machines to cut and bevel 16-in. and larger pipe include the out-of-round attachment.

TAYLOR FORGE & PIPE WORKS, P. O. Box 485, Chicago 90, Ill. — "New Main Line Fittings for Gas Transmission Systems" is a bulletin which describes a unique method of solving some important pipeline construction problems. A new approach is suggested for handling directional changes in pipeline work.